COAL AGE

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There has been a noticeable change in the qualifications of salesmen sent out by various manufacturers. The days of the "four flusher" are numbered and in his stead we find men who are eminently capable of discussing their products from any angle.

As a "mixer" and human visiting card the "four flusher" was almost hypnotic, but, somehow, when arguments and counter arguments were required, he sometimes lost control and his subject's mind would dwell on such proverbs as: "A fool's mouth is his destruction."

The coal industry, along with the other industries, has much to gain by the transformation. We have noted three instances, lately, which demonstrate the efficiency of the new type of salesmanship.

1. A coal mine which produced a low-volatile coal, suddenly found its accessible market territory nearly doubled by a reduction in freight rates. Trial orders were received from a number of possible customers, and everything looked good. But the trial orders failed to result in contracts. Other salesmen were employed, and still the business did not progress beyond the trial-order stage. It was left for a sales engineer to unravel the mystery. All of the prospective customers were accustomed to a high-volatile coal, naturally they did not know that low-volatile coal had different characteristics. This sales engineer made a few trips on locomotives of the railroad whose business was most desirable, and experimented with the nozzles until they were properly adjusted for this particular fuel. After that, the coal sold itself.

2. A coal mine which produced a medium grade of lump coal was unable to show a profit on its operations, because of the fact that too large a percentage had to be screened out and sold as slack. The slack ran very high in ash, and no profitable market could be found for it. A man who had had a wide experience with all kinds of coal was called into consultation. He suggested that a cement works employing the wet process could use the slack coal to advantage. A few cars were sent to a nearby cement plant. Within two weeks a contract was closed for all of the slack, at a satisfactory price.

3. Another mine, producing medium-grade lump coal, had trouble in disposing of its slack at a satisfactory price, notwithstanding the fact that its slack was thoroughly washed. A little experimenting by a coal expert developed the fact that the nut coal contained in the slack gave excellent results as a furnace coal. Following this discovery, preparation was made to screen out the nut from the balance of the washed slack, and this nut coal was extensively advertised. To make a long story short, the nut soon brought in more than the entire slack output had previously sold for, and two-thirds of the slack was still available for sale, at no reduction in price.

Don't think that these three illustrations exhaust the list.

Selling coal often resolves itself, simply, into finding out what the coal is most suitable for, and just so often the success of a coal mine is dependent on a sales engineer.

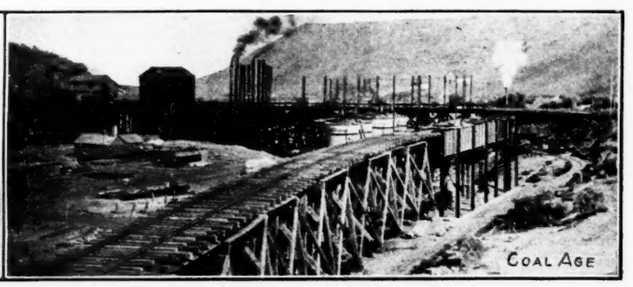
Safety Provisions of Victor-American Fuel Co.

By F. W. Whiteside*

SYNOPSIS—Describes the many precautions that are taken to prevent accidents from explosions, shot-firing, etc. The main object is to impress the thought of danger on a man's mind, so as to eliminate carelessness from his daily work. Several unique devices are employed in the furtherance of mine safety.

With the sincere desire of safe-guarding the mine employees in and about its properties, the Victor-American Fuel Co., of Denver, has been making a careful study of the many sources from which accidents originate, keeping ever in mind the more primitive causes which are so often overlooked or forgotten.

A Landing at Gray Creek, Where Experimental Mine Is Located



Some of the Top Workings at Hastings, Where Instruction Car Is Kept

A great deal has appeared in technical and trade magazines relative to protecting the workman from revolving gears, swiftly moving belts and pulleys, electric wires carrying high voltage, and many of the other mechanical appliances where danger lurks. There is also an education necessary to the workman, to teach him to protect his person against himself, his own personal carelessness, thoughtlessness and the inclination to take unnecessary risks.

Never a day passes in a large city but that someone is maimed or killed. The cause may be an automobile, a street car, a motorcycle or a railroad train. The blame is usually first placed upon the vehicle rather than the victim, yet we know, in the great majority of cases, that the accident was due to the injured individual's carelessness or absent-mindedness rather than to the cause usually assigned. The great majority of people need to learn the simple lesson "Always be careful," "Do not take a chance" and "Safety first." Familiarity is said to breed contempt. It is undoubtedly true that it cultivates carelessness. One who is constantly following a hazardous occupation gradually forgets his own danger and that of his fellows, and becoming over-confident, takes unnecessary risks until he is caught.

A Plan to Overcome Carelessness

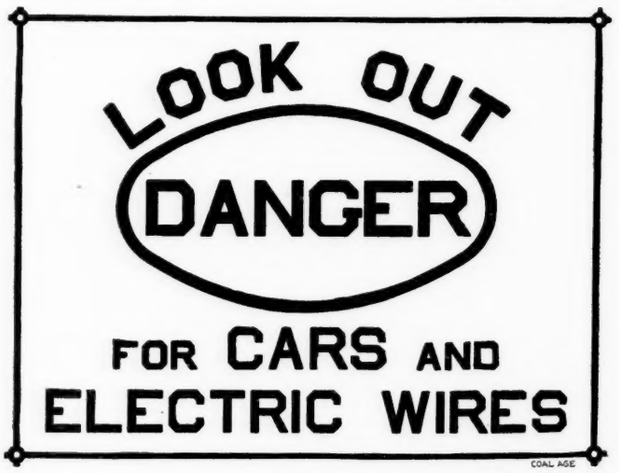
With the view of correcting the tendency toward this growing carelessness, the company has had a pamphlet printed in six different languages, on the subject "Suggestions as to How to Avoid Accidents to Our Employees." This has been freely distributed to the miners, drivers, trackmen, timbermen, trappers and general utility men about the mines. In it, each can find words of caution and advice as to how to safeguard himself and his fellow workmen.

Following the text in each language is a cut of the company's standard danger signal, the word "Danger" in white letters on a dark background, surrounded by the while line of an ellipse. The idea is to create so strong a mental impression upon the man's mind that whenever he sees the sign he will not pass it heedlessiy by, but will instantly come to the full realization of its meaning and govern himself accordingly. This sign, as well as others with appropriate wording, are displayed about the mines where there is need of signal, caution or warning. The standard adopted was drawn up by the Engineering Department upon tracing linen from which blueprints are made upon cloth. This is then varnished on both front and back and mounted upon a board.

In the larger mines of the company as the men enter the mine and travel a sufficient distance for their eyes to become accustomed to the darkness, they are confronted by a flash-light sign with the words "Always be careful" in five different languages. The effect upon the mind is very marked. The surrounding darkness accentuates the vivid white letters which repeatedly flash before the eye.

Handling Powder

To further insure his safety, the miner carries his permissible powder in a fiber box holding eight sticks.



One Style of "Danger" Sign Used by Victor-American Company

*Chief engineer, Victor-American Fuel Co., Denver, Colo.

FLASH-LIGHT SIGN PLACED ALONG ENTRIES

This is hung from his shoulder by a rope or strap. The box is light in weight, and has an air- and moisture-tight cover. Aside from its convenient size and shape, it fixes the maximum amount of explosive that a man will carry into the mine.

The shot-firer carries his firing caps in a fiber box which contains a cork receptacle in which are drilled ?? holes, in each of which is placed a cap, which is thus protected from jar and contact with any metal substance.

The shot-firer is furnished with a blank form (shown below) on which he makes out his report daily, this he signs and turns in to the Superintendent. On the back of this report the following complete list of instructions are printed. There may be no deviation from these rules except by written consent of the Superintendent:

THE VICTOR-AMERICAN FUEL COMPANY

.....Mine, ..., 191...

Shot-firer's Daily Report

District of mine.....

Time first shot fired?..... Time last shot fired?.....

Number shots examined?.....Number tamped?.....

Number fired?.....

Number of shots condemned, reason why, and where located?

.....

.....

Did you fire any shots on main haulageroads back from the face? .....

Number of missed shots, where located.....

.....

.....

Number of blown-out shots, where located, and cause of blow-out. .....

.....

Did you use a wooden tamping bar for tamping all charges?

.....

Did you find anyone in the mine during the time you were firing shots? .....

.....

Did you find any miners with detonators in their possession?

.....

Did you examine all the places again, with the aid of a safety lamp, after you had fired the shots, and leave your initials in chalk on the face where the coal had been shot down?.....

.....

Did you fence off all missed shots?.....

Is your safety lamp clean, and in good condition?.....

Did you find any gas in the working places?.....

State the correct time you left the entrance to the mine?.....

.....

State here any further remarks you wish to make.....

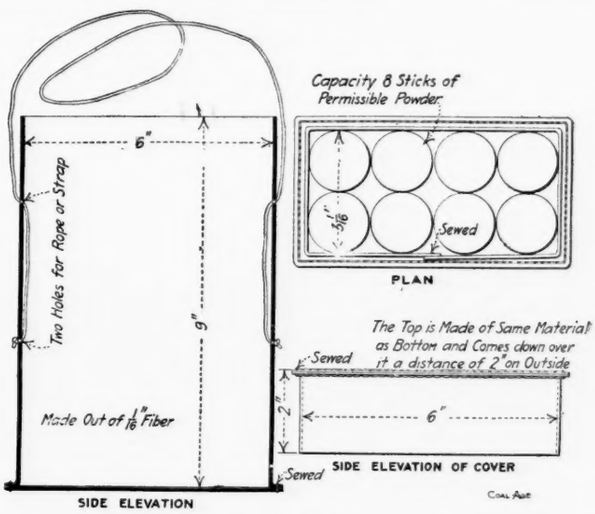
.....Shotfirer

GENERAL SCHEDULE OF HOISTING SIGNALS

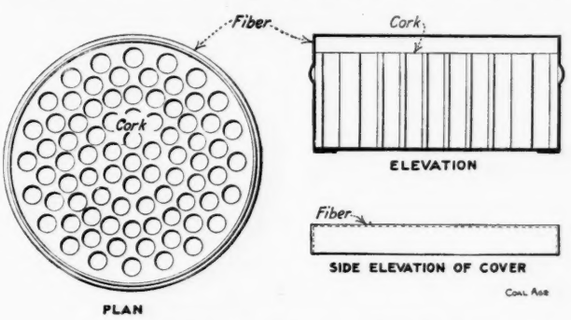
1....	Bell....	Hoist....	If at rest
1....	"	Stop.....	If in motion
2....	Bells...	Lower	
3....	"	Man....	Trip
			Engineer will give return signal by raising cage one foot, setting it back slowly. Men will then get on cage and cager will give engineer one bell to hoist.
4....	Bells...	Hoist....	Slowly
5....	"	Lower....	Slowly
6....	"	Rock	
7....	"	Accident move cage	
		By 'phone orders only.	

ALWAYS BE CAREFUL

1. Holes in coal must not be charged if they are drilled into the solid, or drilled deeper than the undermining.
2. Use only a wooden tamping bar with no metal parts.
3. See that all holes are thoroughly cleaned out and are free from coal dust before charging.

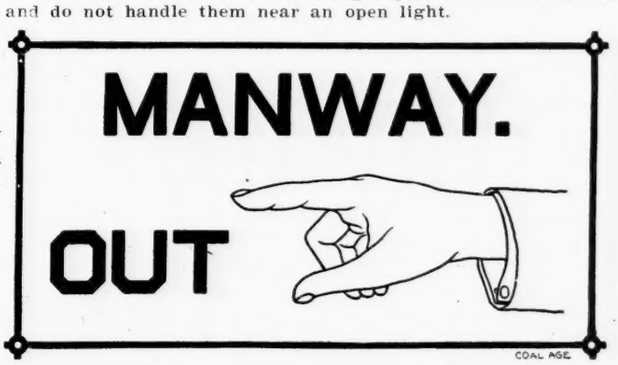


THE MINER CARRIES HIS POWDER IN THIS BOX



SHOT-FIRER'S BOX FOR CARRYING CAPS

4. The charge limit is 1½ lb. of permissible powder per shot.
5. Do not fire any shots on main haulageroads unless you have written authority from the superintendent, and unless the roof, floor and sides are drenched with water, or covered with adobe dust or stone dust, and are free from coal dust for a distance of 100 ft. on each side of the shot.
6. Avoid shooting through a narrow web of coal into an adjoining place.
7. Tamp all holes firmly to the mouth with damp adobe.
8. Fence off every place in which there is a missed shot.
9. Do not smoke when handling explosives or detonators and do not handle them near an open light.



TYPE OF SIGN PLACED AT ALL MANWAYS

10. Do not try to force a primer into a hole of insufficient size.

11. Use great care in carrying and handling blasting caps.

12. Examine during your inspections after firing for gas or fire, using a locked safety lamp. You are warned that powder smoke may contain dangerous gases.

13. Do not charge or fire any holes in a place where you find an explosive mixture of gas.

14. Missed shots must not be drilled out, but a new hole drilled and fired; the new hole to be at least 18 in. away from the missed hole and pointed in a direction from it. After relieving holes are fired, the shotfirer is instructed to endeavor to recover the unexploded caps and powder, or satisfy himself that the cap in the missed shot has been exploded from the concussion of the relieving shot, and report the result in either event after question relating to missed shots.

15. Do not commence firing before time appointed by superintendent.

16. Fill in the daily report accurately and completely.

Fan Shaft Operates Flashlight

At the larger and more important of the company's mines flashlights are operated by the revolving shaft of the ventilating fan, so that so long as the fan is working the lights continue to flash. They are placed in the power station and upon some prominent parting and on one or more of the main haulage ways in the mine. The superintendent, foreman or inspector, by timing the number of flashes, is enabled to determine the fan speed and satisfy himself that the machine is revolving at its normal rate. Should he find that the light is shining steadily or has ceased to show, he knows that the fan has stopped and he is prepared to act accordingly.

While this device may appear to be an unnecessary refinement, yet where the fan is located in an isolated place, far from the power house and the main beaten track, it has proved to be of much value, for without some signal of this nature, it might be stationary for a considerable time before the fact was discovered.

Much has been written concerning First-Aid Work in and about the mines, so that little need be said here.

The fully equipped instruction car of the company is stationed at Hastings, in charge of a regular foreman. Every Saturday four men from other mines come to Hastings to receive helmet and mine-rescue instruction. Located near the car is an abndoned mine, the main entry of which is so full of carbon dioxide and other noxious gases that a safety lamp is usually extinguished within 25 ft. of the mouth. Here in this deadly atmosphere the helmet men receive a part of their training.

The Victor-American electric-mine lamp was devised by some of the company employees at Hastings and has been brought to a high state of perfection. The lamp has extremely high illuminating power, is light, convenient and safe.

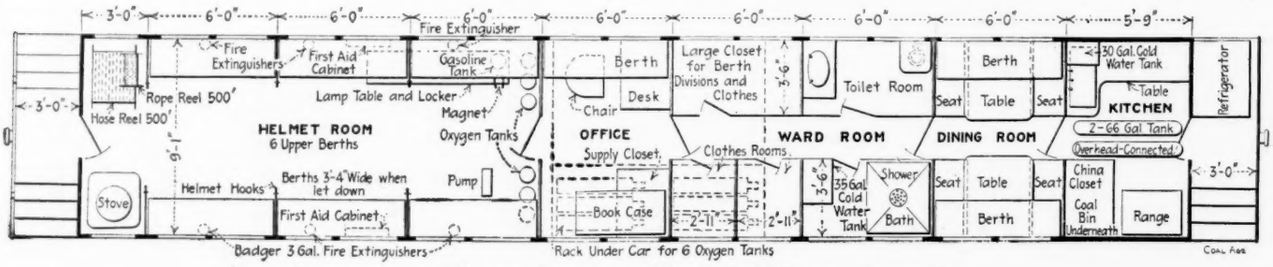
Expect to Test Adobe Dust in Experimental Mine

At Gray Creek, work is now in progress fitting up an old abandoned mine as an experiment station where the efficacy of rock and adobe dust, wet zones and air humidifying as an antedote for dust explosions will each be given a thorough trial.

The Victor company has great faith in adobe dust and has devised a spraying machine for spreading it over the timbers, walls and floors of the mines. It has hundreds of adobe dust shelves in the different workings so that great interest will naturally center in these experiments.

This Abandoned Fan-Engine House Was Converted into an Emergency Hospital

The new Colorado Coal Mining Law, which recently went into effect, prescribes very definitely the manner in which the men shall be checked into and out of the mines. It covers practically all of the main points necessary to safeguard the life of the miner. The operators have been gradually getting their properties in condition to comply with the law, so that it is safe to assume that never in the history of coal mining in Colorado were the mines better protected with safety provisions than today.



Plan of the Victor-American Fuel Co.'s Instruction Car

University Extension

One of the hopeful signs of the times is the attempt of the universities to make their work universally available. H. B. Meller, dean of the school of mines, University of Pittsburgh, is sending out a staff of 35 instructors to the mines of Western Pennsylvania, and it is hoped that 5000 miners will receive training. The dangers of underground work will be explained to those attending the schools, and miners will be prepared for the state examinations, which are held semiannually for the positions of fireboss and mine foreman.

Dean Meller's plans have already received a preliminary test as they were first put in operation in January and proved sufficiently successful to warrant doubling the number of classes and instructors in the new field. State College has a similar scheme under consideration.

Coal Shipping on the Great Lakes

SYNOPSIS—A description of the docking facilities at Chicago, which is one of the more important coal-receiving ports. Also some comments on the personnel of the trade and a look into the future. This is the concluding article on Coal Shipping on the Great Lakes.

The Lake Business at Chicago*

With splendid dock facilities, an immense demand for fuel and a well defined policy for improvements in its harbor and river facilities, Chicago stands among the important ports on the Great Lakes so far as the transportation of coal by vessels is concerned.

There is an average of six large boats bringing coal to this city daily. Records show that the volume of this tonnage has been increasing steadily for many years and the receipts for the current year are estimated at 7 million tons. The record from the opening of navigation, Apr. 10, to Aug. 1 was 2,500,000 tons of anthracite coal and four months remain before the season for navigation is closed. Receipts of bituminous coal by boat are negligible, nearly all of that fuel coming in by rail.

There are many large coal docks here with storage capacities running as high as 200,000 tons. G. G. Schenck operates two, one on the north branch of the Chicago River at Division St. and the other on the south branch at Thirty-fifth St. The latter is equipped with two Mead hoists, has an unloading capacity of 250 tons per hour and a storage capacity of 100,000 tons. The depth of water at the dock is 18 ft. 6 in. and the largest boats plying the river can be handled.

The Division St. dock is a replica of the one at Thirty-fifth St. so far as hoisting facilities are concerned. At Division St. a storage capacity of 55,000 tons is provided and the maximum length of boats which can be handled is 500 ft. At Chester St. on the north branch of the river the City Fuel Co. has a dock with an unloading capacity of 240 tons per hour of soft coal and 300 tons of hard coal; the storage capacity is 45,000 tons and vessels 325 ft. long can be handled.

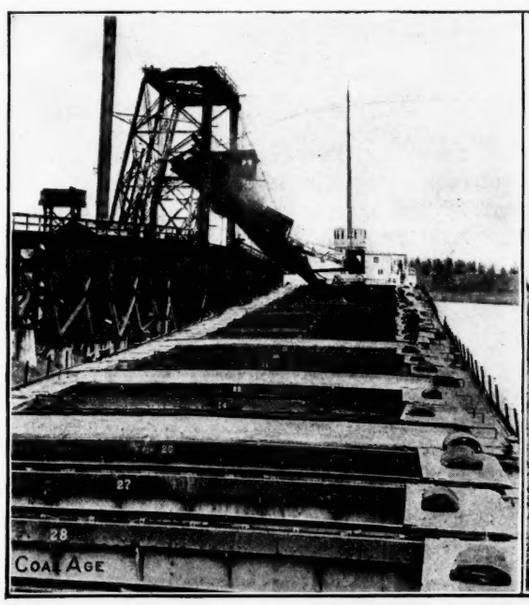
Three docks are owned by the Lehigh Valley Coal Co. The largest is located at One Hundredth St., in South Chicago, and has a storage capacity of 100,000 tons. The unloading capacity for small boats is 300 tons per hour and for large boats 400 tons per hour. There is 20 ft. of water at the dock and boats 480 ft. long can be accommodated. The Chicago Ave. dock of this company has three hoists and an unloading capacity of 2000 tons per day. Its Clybourn Ave. dock is equipped with four Brownhoists and has an unloading capacity of 2000 tons per day. There is storage room at this dock for 35,000 tons of coal and the maximum length of boats which can be handled is 408 feet.

E. L. Hedstrom & Co. operate two docks. The North Ave. dock has two Mead hoists and the unloading capacity is 2000 tons daily; there is storage room for 30,000 tons of coal. The depth of water at this dock is 18 ft. 6 in. and 440 ft. is the maximum length for boats.

At the Ninety-fifth St. dock of the company there is a storage capacity for 60,000 tons of coal. Three thousand tons can be unloaded daily and there is room for boats 525 ft. in length. The dock with the largest storage capacity is owned by the Byproducts Coke Corporation. It is located at 112th St. and has storage room for 200,000 tons of coal. Facilities have been provided for unloading 500 tons per hour. Any coal-carrying vessel not longer than 600 ft. can be handled.

Other docks in Chicago used for handling coal are owned by the Philadelphia & Reading Coal & Iron Co., O. S. Richardson & Co., Pittsburgh Coal Co., Dreske & Minners, Eureka Coal Co. and O. F. Scheunemann & Company.

*By Herbert Waters.



Loading at the B. & O. Dock No. 2 at Lorain, Ohio

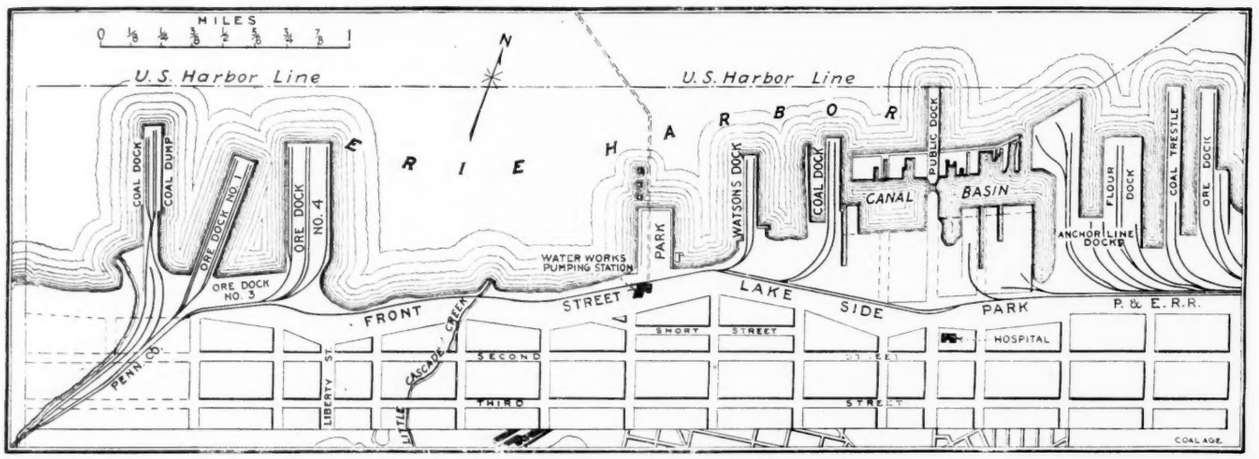
Freighter "Henry S. Hill" Clearing from the Y. & O. Dock at Erie, Penn.

The Personnel of the Lake Trade*

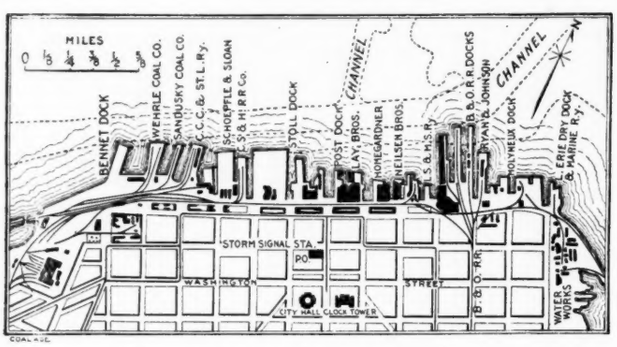
Distinctiveness as coal merchants and shippers is due rather to the members of the anthracite trade of the lower lakes than to those in bituminous, for the latter are more closely identified with mining and the iron-ore trade. The anthracite mines are farther from the lakes as a rule than the bituminous. It is not easy to mention a heavy shipper of bituminous on the lower lakes who is not also in some other and allied business. At the same time the personalities are much more apparent in the receiving territory of the upper lakes, in which case both anthracite and bituminous are generally handled by the same concern. On the lower lakes the two are usually separate, although there are one or two notable exceptions.

Without going back to the pioneer days of the trade when all concerns as a rule were on a small scale, the name of A. B. Meeker, of Chicago, will always be remembered as a powerful factor, both as an organizer and a producer of business. He was connected in Buffalo through E. L. Hedstrom, who located there about 1864, and was also prominent in the trade while he lived. The name of Jervis Langdon is also among the older shippers of anthracite from Buffalo. At one time at the Buffalo office of J. Langdon & Co., C. M. Underhill and J. J. McWilliams were employed, the latter long known later on as the Buffalo representative of the Delaware, Lackawanna & Western interests, the heaviest anthracite shippers on the lakes. Mr. Underhill is still living, having been prominent in the trade all his life. Among others of that trade are H. M. Benjamin, of Milwaukee, and O. S. Richardson, of Chicago. Out of the Benjamin office also came men who are still in the trade as managers of later companies such as the Milwaukee-Western Fuel Co. For a long time Robert Law was a leading member of the coal trade in Chicago, handling large amounts of coal received by lake. With him ranked S. C. Schenck, of Toledo, and later on also in Chicago.

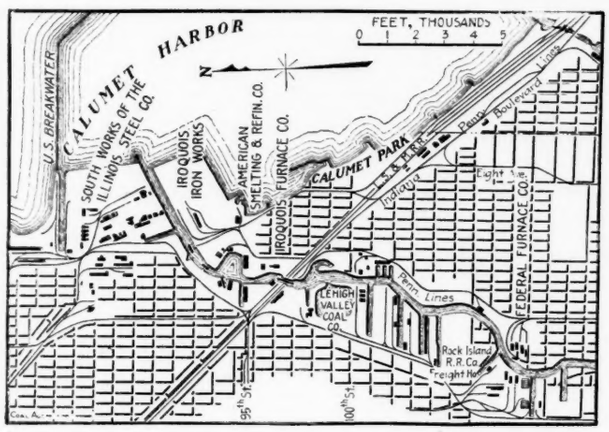
At other lake ports large coal shipping and receiving interests have grown up. At Sheboygan, on Lake Michigan, the activity and good business talent of Conrad Reiss long ago laid the foundation of the C. Reiss Coal Co., which is now a large family concern, with receiving docks in several upper-lake ports. At Erie, Penn., the leading name in the trade was that of W. L. Scott & Co., which company shipped both anthracite and bituminous as does its successor, the Susquehanna Coal Company.



Map of Erie Harbor at Erie, Penn., One of the Largest Bituminous Loading Ports on the Lakes



Map of Sandusky Harbor, Ohio



Map of Docking Facilities at South Chicago

A Look into the Future

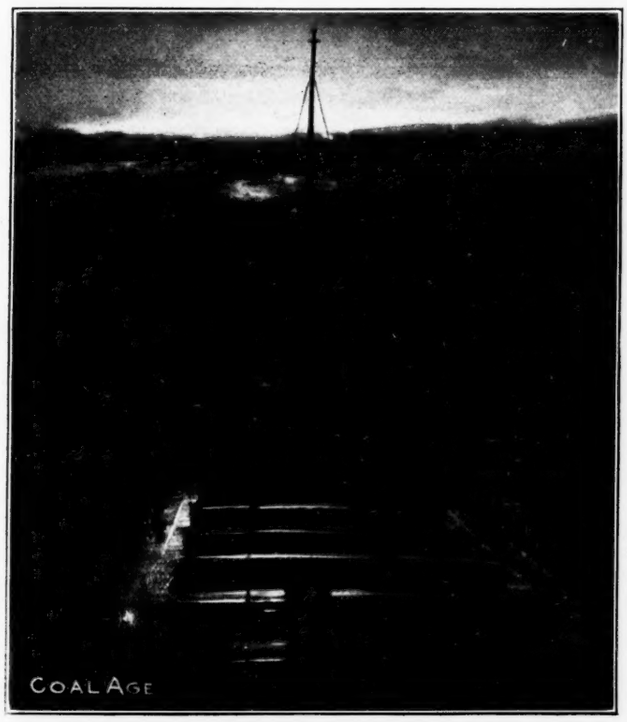
It may be possible that the younger members of the lake coal trade of today have as many problems to solve as did their predecessors, but in that older day most of the difficulties were of a formative nature requiring business talent of a high order and there is no doubt that these men possessed it. The great problems of their day had to do with the establishing and extension of trade in new territory and the adaptation of new routes and appliances to the needs of such a trade. There was more

*By John W. Chamberlin, 90 Johnson Park, Buffalo, N. Y.

competition from other fuels then than now, but the competition, especially in bituminous coal, is now chiefly within the trade itself.

The present leaders of the lake trade have to deal with the shipping and handling facilities offered. They have assisted in transforming the 600-ton lake schooner into the 10,000-ton steamer and the old horse-and-bucket hoisting device into the fast car dump and the clam-shell unloader. The change has been so well made that, like the size of the freight car and the length of the freight train, mechanical genius appears to have found its limit.

The natural question is "What next?" Pioneer work is all done. The merely mechanical aids to cheapness and facility are about at the limit, yet the tendency is to advance, if not by the old lines then by the new ones. In common with most branches of the distributing industries the problem of cheap selling has in no wise kept



"FINIS"

pace with the decrease in handling and distributing costs. What the consumer pays is often very much more than the aggregate first price and the cost of transportation. Here is still a wide field for the trade to improve upon.

As to the future of the lake coal trade not much needs to be said. There have been no great changes in late years and if all-rail competition has reached its limit, as seems to be the case, the natural growth of demand from increased population will accrue to the lake trade. Competition from gasoline, electricity and water power direct is mostly a matter for conjecture. The general idea is that coal will more than hold its own for a long time yet. The lake cities and towns are developing very fast and they must have fuel and power. The rail competition does not control the lake coal carriers as it does the package-freight vessels, so that competition between the two is open and free, with coal shippers always in the market for the lowest possible rates.

It would seem that the coal trade of the lakes has a long and prosperous future and if the enlarged Welland Canal adds Lake Ontario to the list of inland seas this unrivaled water route of 1000 miles will add very materially to its available scope and territory.

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Don'ts for Those Using Detonators

The E. I. du Pont de Nemours Powder Co. publishes the following instructions for those using blasting caps:

There are about 600 accidents every year caused by children and others playing with or investigating the contents of electric and other blasting caps. In nearly every instance these accidents result in loss of the sight, one or more fingers, or perhaps hands, rendering the unfortunate victim a cripple for life and a charge on his relatives or the community. As long as miners, quarrymen and blasters carry blasting caps, electric or other, loose in their pockets or leave them in unguarded places, children will find them and will almost invariably be badly hurt.

Blasting caps should never be carried loose in the clothing and no more than the number required at the time should be taken from the storehouse. They should always be kept under lock and key and in a place where unauthorized persons and children can, by no possibility get at them. This is a matter which should have the serious consideration of every person who has to do with the use of these articles.

(1) Don't forget the nature of blasting caps, but remember that with proper care they can be handled with comparative safety.

(2) Don't smoke while you are handling blasting caps, and always keep them away from lights.

(3) Don't shoot into blasting caps, whether electric or other, with a rifle or pistol.

(4) Don't handle or store blasting caps in or near a residence.

(5) Don't allow blasting caps to be stored where children or irresponsible persons can get at them. Keep them under lock and key.

(6) Don't store or transport blasting caps of any kind with high explosives.

(7) Don't keep blasting caps, electric or other, in a damp place.

(8) Don't carry them in your pocket.

(9) Don't tap or otherwise investigate them.

(10) Don't try to pull the wires from an electric blasting cap. The wires should not be jerked or roughly handled.

(11) Don't attempt to take blasting caps from the box by inserting a wire nail or other sharp instrument.

(12) Don't allow priming (the placing of a blasting cap in dynamite) to be done in a thawing house.

(13) Don't fasten the blasting cap to the fuse with the teeth or with a knife. Use a cap crimper made for that special purpose.

(14) Don't handle electric blasting caps during the immediate approach or progress of a thunder storm.

(15) Don't attempt to use electric blasting caps with the regular insulation for very wet work. For that purpose, use waterproof fuses.

(16) Don't use old broken leading or connecting wire for electric blasting caps. A new supply will not cost much and will pay for itself many times over.

Experimental Explosion at Bruceton Mine

SYNOPSIS—Details of the explosion and conclusions reached by Messrs. Rice and Jones. They believe the cars were blown into the mine by detonation and not by unbalanced atmospheric pressure resulting from a vacuum formed at the face after the explosion.

G. S. Rice and L. M. Jones have made public a report on the experimental explosion at Bruceton, Sept. 23, 1913, known to the Bureau of Mines as experiment No. 46. The following minor supplementary facts are culled from this report:

Coal Dust—In all 2200 lb. of coal dust were placed inby of the Garforth and Taffanel barriers and 800 lb. were distributed outside these so as to extend the explosion should they fail to do their work.

This loading of coal dust gives a layer of ¼ to ⅜ of an inch on the 3-in. width of each of the ten shelves along the sides of the entries. Some dust was spilled on the floor in distributing it and wherever a puddle of water was encountered, a small amount of coal dust was spread over it. The cross-section of the entries measures approximately 60 sq.ft.; 2 lb. per foot of entry would, therefore, be equivalent to 0.523 oz. per cubic foot of space. This is 4.3 times the theoretical amount which for complete combustion will exhaust the oxygen present.

The Taffanel and Garforth Barriers—The average depth of the stone dust in the Taffanel barrier was 9 in. and its total weight on the shelves was about 1.8 tons. The under sides of the shelf boards were 5 ft. 6 in. from the bottom and the height of the entry averaged about 6 ft. 10 in., the shelves and dust occupying 10 in. The ratio of the cross-section occupied by the barrier shelves to total cross-section of the entry was 10/82 or 12.2 per cent. The stone-dust zone in the air course was 300 ft. long, from A 1050 to A 750, and the stone dust was placed on the side shelves and partly on the ribs, the loading being 4½ lb. per linear foot of entry.

Character of Coal and Stone Dust Used—The coal dust was prepared by grinding the coal mined from the face of the air course. As will be remembered the coal worked at the experimental mine is part of the Pittsburgh bed. An average analysis and screen test give the following results:

Analysis		Fineness	
Moisture	2.43	100 %	through 80 mesh
Volatile matter	35.10	99.1%	through 100 mesh
Fixed carbon	54.49	94.2%	through 150 mesh
Ash	7.90	88 %	through 200 mesh
	99.92		
Sulphur	1.18		

The stone dust used was prepared by grinding the draw slate which occurs above the Pittsburgh seam in a hammer crusher equipped with a very fine screen. A screen test gave the following results: 50.5 per cent. through 80 mesh; 41.5 per cent. through 100 mesh; 38 per cent. through 150 mesh; 35.5 per cent. through 200 mesh.

The dust contains about 7.98 per cent. of combustible matter.

Air Current—A sample of mine air taken at the face of the main entry before firing the igniting shot showed normal mine air with no methane present.

The humidity of the air current increased from 82 per cent. at a point in the main entry 200 ft. from the portal to 97 per cent. at the last crosscut.

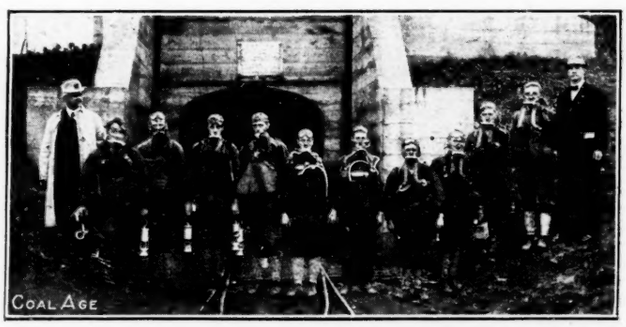
General Humidity Conditions—The sides and roof of the mine were damp and sticky to the touch and in some places on the main entry from 150 to 300 ft. from the face the roof was wet. The floor for the most part was damp and well packed. The surface had been swept and the floor cleaned so that practically the only coal dust likely to have taken part in the explosion was that artificially distributed and this the analysis indicates was quite dry.

Obstructions—The cars were placed in the main entry for the purpose of obstructing the passage of the explosion, thus increasing the resulting pressures; the one in the cut-through was used to prevent, as far as possible, the dissipation of pressure near the origin which might occur due to the increased space at this point.

Appearance of Explosion at Openings—A small puff of smoke first appeared at the main opening and a muffled report, which was probably the sound of the igniting shot. Immediately afterward a tremendous cloud of smoke and dust shot out of the main opening accompanied by a loud report. Some of the $\frac{3}{16}$-in. steel plates covering the top of the concrete relief section were thrown high in the air, one of them about 20 ft. above its original position. Pieces of boards and shelves were scattered in front of the opening, on the slate dump and in a field on the opposite side of the valley from the mine. Two 8x8-in. posts were found, one 250 ft. and the other 350 ft. from the opening.

Length of Flame—All points in the main entry are measured from the main portal and the distances are marked with a capital E preceding the figure. All points in the airway immediately opposed to points in the main entry are marked with a capital A and the figures denoting their distance along the airway are identical with those of corresponding points in the main entry. This preliminary statement will help in interpreting what follows.

The evidence concerning the length of flame was somewhat complicated. Gun cotton is used to get supplementary information as to length of the flame, but the chief reliance is placed on the lead foil of the circuit breakers in the main entry. However, in this heading the gun cotton on the station plate at E 250, as well as the tin-foil flame circuit breaker, was gone but those on the wires at E 275 and on station plate E 350 were not burned while those at E 325 and E 372 were only partially consumed. The stone dust, therefore, did not at once completely blanket the flame, but permitted a tongue of flame to extend some distance beyond. It is improbable that the coal dust outby the barrier influenced the explosion.



RESCUE CORPS OF BUREAU OF MINES AT MOUTH OF EXPERIMENTAL MINE

In the air course the flame extended out to about A-700. On this side also there were a number of gun-cotton tufts only partially consumed; although the flame probably extended beyond the stone-dust zone, yet it is improbable that any of the coal-dust outby that point took part in the explosion, or the flame would have extended to a point much farther out.

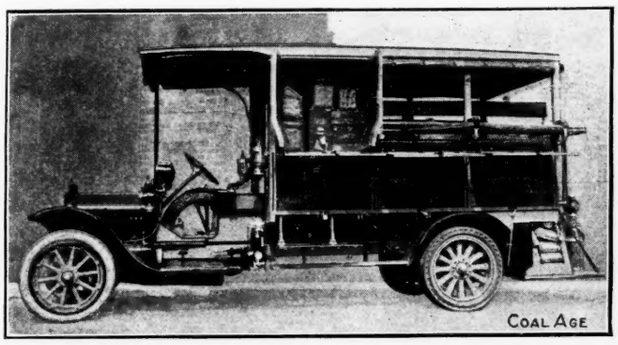
Damage Within Mine—An 8x8-in. post from E 232 was found at E 75. Pieces of the Taffanel barrier from E 500 to E 440 were found along the floor from E 180 to the opening. The posts found in the field across the ravine probably were blown from rib grooves at E 425 and E 460 indicating travel of over 700 ft. A post found across the track at E 310 was probably blown from the rib at E 495. A post against the east rib at E 410 was thought to have been blown from the rib at E 525. A post at E 425 near the east rib was identified as having been blown from E 550. A post at E 570 was originally at E 588. The reinforced-concrete stopping in the crosscut at E 650 has a small crack for a foot above the door. Two cracks, $\frac{1}{16}$ in. wide, extending from top to bottom of the stopping in line with the sides of a doorway through the stopping appear on the air-course side. There are also minor parallel cracks. A post from the line brattice at E 775 was found at E 745. The loaded car originally at E 925, with sprag set, was moved to E 954. It was still on the track. The loaded car which had been at E 1000 had jumped the track 3 or 4 ft. inby and was caught against the rib, at E 1045. About 8 in. of topping had been blown off. A shelving post against the west rib at E 1092 was identified as having been in a groove at E 950. The loaded car which had been at E 1075 was lifted from the track not far from its original position and thrown inby. Near E 1105 it made a scar in the roof 11 ft. long and several gouges in the floor, breaking a tie at E 1107. The car broke numerous side shelves and finally landed diagonally across the entry at E 1222 with all dirt out of the car and with sideboards and closed end badly broken.

The track at E 1222 was moved 3 in. to the east by the car wedging between the rib and rails.

A shelving post originally set at E 1090 was found against the east rib at E 1132. The boards in front of the cut-through cannon had been broken up and scattered. Four short 8x8-in. blocks from this bench were blown to the face of the entry; the other was found in the air course at A 1240. The car placed in the cut-through was blown against the air-course rib opposite the crosscut and part of the load spilled out. It knocked out the lead rail and scarred the transfer rail of the crosscut switch. The cross bar of the curtain frame on the air course at A 875 between the butt entries was blown outby to A 500, 375 ft. of travel.

Coked Dust—Very little coked dust was observed after the explosion. Some was seen on the outby side of the post at E 639 on the east side of the heading. A small patch of coked dust was noted on the outby side of a nut on a shelving bolt at E 700, on the west side of the entry. Coked dust deposit was found on the outby side of a post at E 755 on the west side of the entry. Coke globules were found on the entry side of the crosscut stopping at 850. Coke globules, $\frac{1}{16}$ in. and less in diameter, were found on the floor from E 855 to E 1000. A coked dust deposit was found on the outby side of a post near the top at E 1072 on the east side. Coked dust deposit was found on the outby side of a post at A 1118, on the west side of the entry; also on outby side of post at A 1090, on the east side.

Coal Dust—Practically all the coal dust was swept off the shelves by the explosion. The only exception was in the air course from 1250 to 1050, where about one-third remained in position. There was considerably more dust on the floor in the inner portion of the mine than in the outer and it seems probable that much of this remained on the shelves when the explosion passed, but was swept off by later pressure waves passing inby.



THE RESCUE AUTOMOBILE, SHOWING MANNER OF LOADING

Conclusions—This test confirmed previous experiments: (1) That it is possible to get a violent explosion in a mine where the surfaces are damp, if there is an ample supply of dry coal dust present. (2) That as a secondary defense, the Taffanel barrier is of great advantage. It is fully recognized that an explosion, such as this, would suffocate all the men in the section of the mine in which it occurred and hence means to prevent an explosion originating are most important; but if by any mishap an explosion should take place in one section of the mine, it would be desirable to have the other sections of other splits defended by such barriers, in order to prevent the explosion from passing from one section to other sections. (3) That a zone treated with sufficient rock dust will prevent the passage of an ordinary explosion, which is also illustrative of the impossibility of starting an explosion in a well treated zone.

There was one feature of more than passing interest in this explosion, confirming other explosion experiments at the mine, namely, the development of the explosion center; its passage past the cars, and its increase in intensity, whereby it was enabled to throw the cars back toward the origin of the explosion. The latter effect cannot be considered the result of a wind filling the vacuum at the face following an explosion, for while this would be able to throw light articles it could hardly have hurled heavily laden cars through the air.

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The gas engine operated by producer gas furnishes an efficient means for conserving fuels by making available for power generation such low grade fuels as peat, lignite, low grade coals, waste gases and even cornstalks; in fact, almost any low grade combustibles or wastes may be used to furnish the gas.

The Situation in Colorado

SPECIAL CORRESPONDENCE

The strike situation in the southern Colorado field has not materially changed since last week. There have been some clashes between strikers and mine guards, the most notable being that at Oakdale, near Walsenburg.

These have been stigmatized by union leaders as "frame-ups" on the part of operators and guards in order to mold public sentiment. This assertion is hardly logical. Men are not given to firing such formidable cartridges as the 25-35, 30-30, and those of similar type and power at each other, even at distances of 500 yd., merely for the purpose of producing a psychological impression upon the public.

Although the net changes in the situation have, as stated above, been small, the condition is nevertheless assuming a portentous aspect. More than once the governor has been requested to call out the state troops, and although this request has come from civil officers, it has been persistently denied. Both parties to the strike seem as determined as ever to fight until the end.

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To Make Shotfiring Less Dangerous

BY CHARLTON DIXON*

The flame-producing explosives, now largely used in mines, should be and, in my opinion, will be, at no distant day, replaced by a comparatively safe means of blasting. The science of chemistry is yet in its infancy, and things that seemed impossible, a few years ago, are now commonplace. If the scientists and specialists of the great Carnegie, Rockefeller and other Institutes were requested to specialize on the matter of providing a safe explosive for the coal mines, and were encouraged in the work by the guarantee of a substantial reward, there is little doubt, but that a satisfactory substitute for black blasting powder would be found in a short time. I would like to see this matter brought prominently to their attention. It is certainly as important, if not more so, than the annihilation of the hookworm, which has received so much attention recently.

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Colliery Construction in Yorkshire, England

Arrangements are being made, according to the *Daily Consular and Trade Reports*, for sinking a new colliery at Darton, near Barnsley, Yorkshire. An area of 2300 acres has been acquired. It is expected to reach a 4-ft. bed of coal at a depth of 260 yd. The new colliery will have two shafts 14 ft. in diameter, with steel headgear of the latest design, and arrangements to facilitate handling coal.

A screening and washing plant will be erected 80 yd. from the shaft. Steam power will be used for winding purposes, but electricity will be employed for driving the fan and other surface plant, and lighting. The loaded cars will gravitate from the screens to the railroad. Coal will be carried from the shaft to the screens by creepers. The colliery, when completed, is expected to employ 1500 men.

*Pittsburgh, Penn.

Shotfiring and Watering Systems in Utah Mines

By John E. Ambrose*

SYNOPSIS—A good description of electric shotfiring, as conducted in the mines of the Utah Fuel Company. Division of the work of mining the coal, drilling, charging and firing the holes, and inspecting the system. The spraying system in use. Effect of humidity in reducing the dust danger in mines.

During a recent inspection of the Utah Fuel Co.'s coal operations at Winter Quarters, Clear Creek, Castle Gate, Willow Creek and Sunnyside, I had the pleasure of seeing one of the most complete shotfiring and watering systems that has ever come under my observation, during my experience of 30 years in coal mining. These mines are all under the direct supervision of W. B. Williams, the general superintendent of the company. Mr. Williams is an able and practical mining man to whom a great deal of credit is due for the system he has installed at all the mines under his supervision. The system may be described as follows:

The Work of the Miners

Each miner takes his required allowance of explosives or black powder into the mines in the morning. This amount, not to exceed 5 lb., is kept in a wooden box made for the purpose. He then proceeds to undercut the coal to a depth of 4½ or 5½ ft. Holes are then drilled to a depth 6 in. less than the depth of the mining. When undercutting the coal, the strict rules of the company compel the putting in of sprags, for the better protection of the miner while doing the work. All minings are loaded out as the cutting progresses.

The Work of the Inspectors

About 12 o'clock, noon, the local inspectors of the various districts, proceed to the mine, taking with them the detonators (electric exploders) and make inspection of all cuts made in the coal. These cuts are measured; also, the depth of each hole, which must clear the rib by at least 12 in. The resistance against each shot is carefully considered by the inspector, who then proceeds to charge the hole, after first seeing that it has been previously cleaned out thoroughly by the miner. These holes are tamped with damp surface clay, to the mouth of the hole, with a wooden tamping stick.

The miners are not allowed to go near the shots after the holes are loaded. The inspector proceeds thus to the end of his district. All drill holes must have a sufficient clearance in the hole to allow the charge to be pressed home, without friction or jamming, thus overcoming the danger of prematurely exploding the charge.

The Work of the Shotfirers

During the afternoon, the shotfirers proceed to the separate districts allotted to them. Each man unlocks the box containing the switch for his entry, and sees that it has not been tampered with. He leaves the switch thrown out and again locks the box. It may be remarked here that this does not interfere with the haulage motors, as they are on a separate line. He then proceeds to the face of the entries and connects up the shots; from here he goes from room to room, till the work of connecting up the shots is completed. The method of connecting the shots is illustrated in the accompanying figure.

The miners are now all out of the mine and the shotfirers return to the entry where the main switches are still thrown out. The company has a system of checking off the men as they enter and leave the mine. The checkboard is kept in a case made for the purpose, at the fan house and in charge of the fan man, whose duty it is to check off each miner as he comes out of the mine. When all the miners are out of the mine, and the proper time has arrived, as previously arranged by the shotfirers, the fan man throws out the main switch and gives a series of signals to the shotfirers, who are at their respective places on the main entry, waiting for the signal. They then throw in the main-entry switches, and retire to the bottom of the shaft, where they meet previous to going out of the mine. The fan man now informs them that all the miners are out of the mine, according to the checking up of the board and they return to the surface.

Firing the Shots

The fan is then slowed down, and after a few minutes have elapsed, to allow the air current to come to a partial state of rest, the main switch on the surface is thrown in, which fires all the shots simultaneously. After the lapse of half an hour or so, the shotfirers again enter the mine and, going to their respective districts, throw out the main-entry switches, at the different places on the main cross-entries. Having done this, they lock all boxes and the firing is complete.

Inspection and Repair Work

During the forenoon, wiremen go into the mine and examine the different districts, putting up and repairing the wires blown down by the shots the night previous. The inspectors locate all blownout and missed shots, if there are any, and make a report of them in a report book kept on the outside for the purpose. These missed shots will occur with the best and most experienced men. If, however, the inspectors would carry a testing machine with them, for testing the electric exploders, they would overcome some of the difficulty. At the same time, many misfire shots are caused during the act of loading the holes; as, in tamping, the insulation is liable to be rubbed off the wires, which causes a contact and short-circuits the current.

The Spraying or Watering System

The system of watering the mine is as follows: A pipe line is laid along the main entry and sections run up each cross-entry, from which branch-line connections are made to each separate room. Sprinklers are employed, who have a certain section to sprinkle during the day, till a certain time before the time of firing the shots. The mines are kept saturated with water, the spraying being done not in the haphazard way seen in some mines today, but the system is kept up continually, at all working faces as they advance, and the ribs, pillars

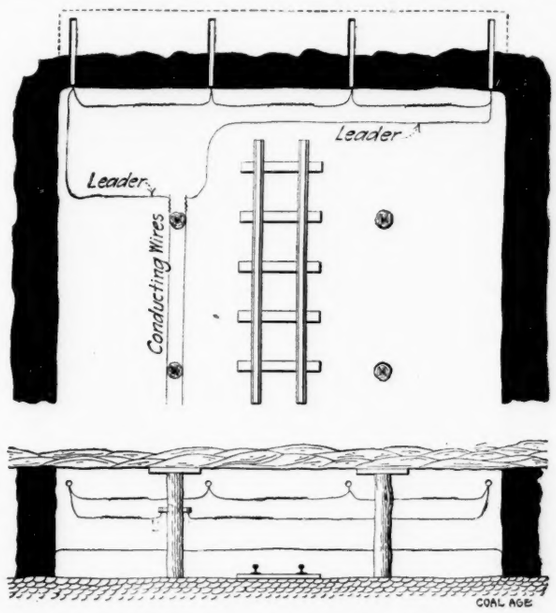
*Mining Engineer, New Durham, N. J.

and all roadways are well watered, not once a week, but every day; and not sparingly, but plentifully.

The Ignition of an Inflammable Atmosphere

It was stated before the Coal Mining Institute of America (June, 1908), that coal dust cannot be made wet in a usual sense. The method of fine spraying is productive of the best results; but even then, it is questionable, as the most careful system of watering is merely an "ounce of prevention" and it is an open question whether it is not positively detrimental.

These statements are fallacies, in my opinion. Mr. Ashworth referring to this matter, pointed out (*Transactions I.M.E.* Vol. XXXIII, 193) that no form of water except steam could saturate an air current sufficiently to place



Showing Method of Connecting Shots to Be Fired by Electricity

a barrier in front of a gas or dust explosion. But if the dust is properly saturated and made wet, there will be no floating dust and there will result only a local explosion of gas.

Mr. Ashworth further deduced from the hygrometrical observations taken at Wingate Grange, that air saturated with moisture was no protection against the extension of an explosion, claiming on the other hand that it assisted in the oxidation process; and stated, in addition, that the explosion (Wingate Grange) was reported to have passed over two wet places of considerable length. Now, it seems clear to me that if the so called wet places referred to, had been extended to the outside, along each haulage road, the force of the explosion would have been spent in its passage out, having nothing to feed upon. I think that if these places are kept saturated constantly, like the system installed at the above named operations, there can then be no dust, and these explosions, if there are any, must be local. At the above operations the exhaust steam from the fans is turned into the intake airways, directly after the shots are fired, and anyone coming out of the mines then can feel the effect of it for some distance before reaching the outside as the steam moistens the air for thousands of feet in the workings of the mine.

Again, J. B. Atkinson, late H. M. Inspector of mines, in his report on the circumstances attending the explosion that occurred at the Washington Glebe Colliery, Durham, Feb. 20, 1908, comments on the general interpretation of the Coal Mines Regulation Act, and the explosives in Coal Mines Order, and states that a claim of exemption from watering cannot be supported.

Concerning Permitted Explosives

It may be said, however, that shotfirers look upon permitted explosives in this light; and do not take the precaution they would take if using black powder. Mr. Atkinson further states, "I do not altogether share the view held by some of my colleagues, that the decline in explosions, in recent years, is principally due to the employment of permitted explosives. I think it is more probably due to the increased knowledge of the causes of explosions, generally. Safety should be sought outside the shothole, and the use of permissible explosives should only be looked upon as an additional safeguard."

I am of the same opinion myself and believe the above are practical facts, considering the risks that some classes of shotfirers assume in doing their work in a careless, daredevil sort-of-way. As Mr. Atkinson states, exemption from watering cannot be upheld. The practice stands upon record as the best system, if thoroughly installed, of laying the dust in coal mines as a prevention against the extension of explosions. It stands to reason and good judgment, that if the system is properly installed, and then kept down, by loading it out of the mine, it must have the desired effect.

In Bulletin, No. 425, Department of the Interior, on The Explosibility of Coal Dust, p. 73, in reference to the treatment of coal dust, there is the following statement:

> The method of using pipe lines through the mine, with connections at intervals for attachment of hose, was introduced in England and used to a slight extent, after the report, in 1886, of the Accidents In Mines Commission. In the same year, W. N. and J. B. Atkinson published their book "Explosions in Coal Mines." In their suggestions for remedies, they state that the use of water pipes, with cocks at short intervals and hose, is a better system, and they advise that where watering causes trouble by affecting the roof and floor, the mine may be divided into sections by arching entries, whitewashing the arched sections, and sweeping up the bottom dust.
>
> In Germany, in consequence of the report of the Prussian Firedamp Commission of 1885, watering, chiefly by hose sprinkling, was introduced. . . . The mining department now insists that the roof and walls of the gangways, be not merely sprinkled, but washed by a stream from a hose. . . . .
>
> In the United States, the system of watering by hose and nozzle has been employed in the coal mines of Utah, since the Scofield disaster of May 1, 1900, and it is now required by the Utah mining law. The conditions for the use of this method in the Utah field are very favorable, as the floor and roof are generally sandstone, and are therefore not affected by the direct application of water. . . .
>
> Wherever the method can be employed it is undoubtedly an efficacious one, particularly if the water pressure is good, but it requires constant effort, and the employment of men to go continually from point to point.

The writer is of the opinion that too much time is allowed to elapse between the shots fired by the shotfirers and the time the firebosses make their inspection of the mine, the following morning. We may assume that a feeder of gas is ignited at the face when the shots are fired, as happens every day, in some of our mines. This feeder burns several hours, and sets fire to the loose coal at the face, which is not detected until the fireboss makes his rounds the next morning, causing untold troubles and disastrous results. I think this is a point that should be well considerd.

POWER DEPARTMENT

Burning Anthracite Culm

By J. E. Parrish*

SYNOPSIS—At the present time no anthracite which will pass through a $\frac{3}{32}$-in mesh screen is salable. A few years ago there was no market for sizes as large as pea. Improvements in boiler and furnace design have rendered the reworking of the old unsightly culm banks not only possible but profitable. It is not unreasonable to expect that in the near future further refinements in grate and furnace construction will render available for steam-making even the "slush" or "mud."

According to statistics, the anthracite coal fields of Pennsylvania cover an area of about 480 sq.mi. Approximately, 200 sq.mi. are comprised in the northern or Wyoming territory, 130 sq.mi. in the middle territory, while 140 sq.mi. or thereabouts, is included in the southern territory.

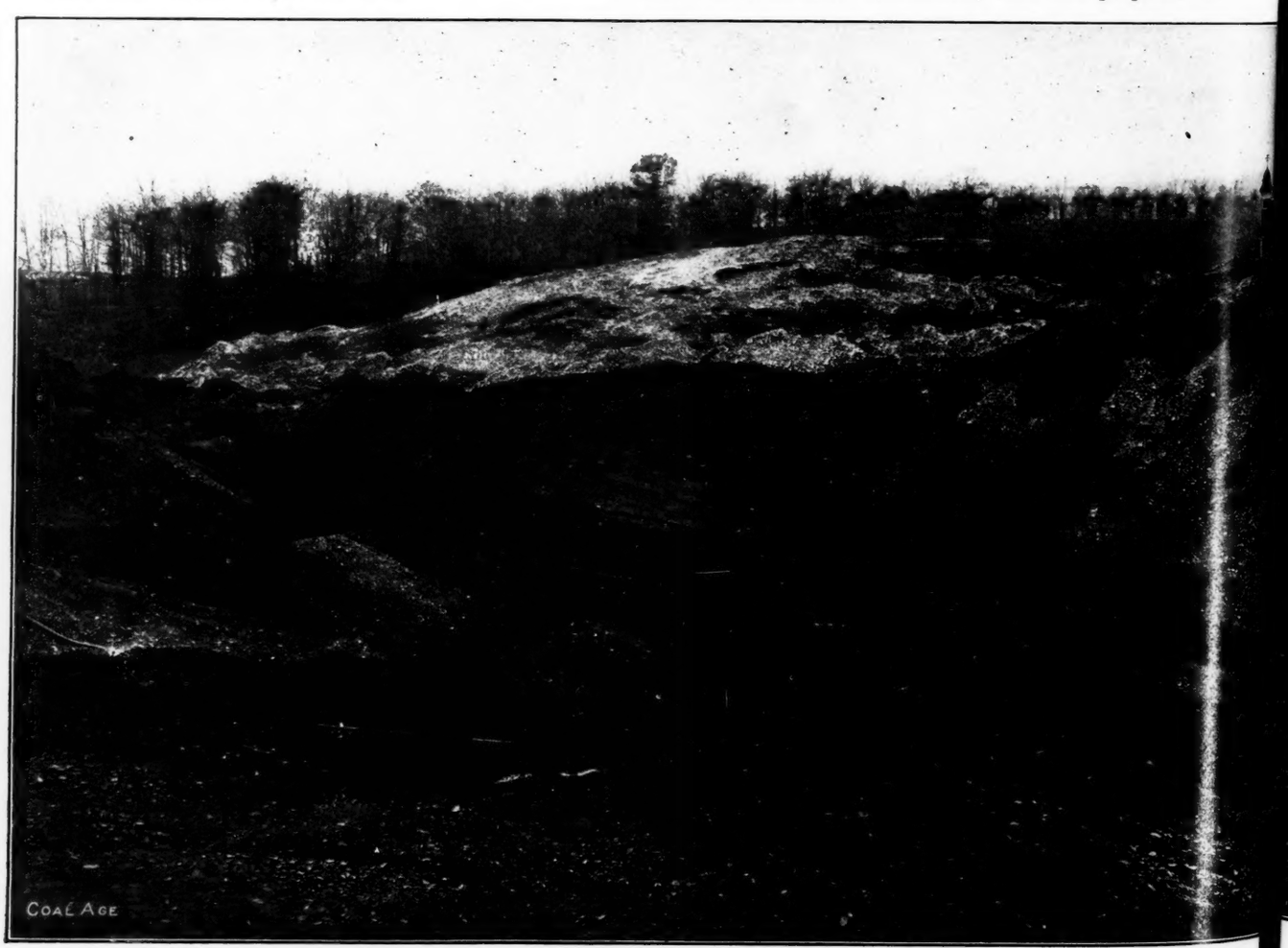
*Mechanical engineer, Scranton, Penn.

The growth of the anthracite industry is well illustrated by statistics. In 1820, the anthracite production was 365 short tons, or one ton for each day in the year, in 1912, it was 84,426,869 short tons, or 231,306 tons daily.

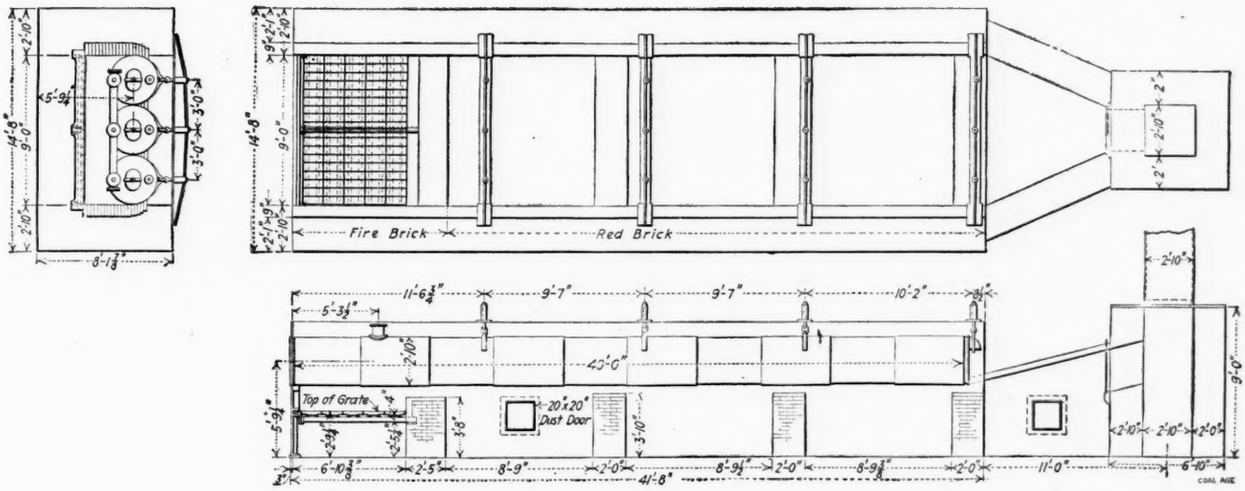
Mr. L. F. Loree, president of the Delaware & Hudson Coal Co. in July furnished to the Philadelphia *North American* some interesting figures as to the cost per ton for producing anthracite coal during the years of 1902 to 1912. The article by Mr. Loree has probably been read by many interested in coal mining as well as other similar articles upon the production of coal which have appeared from time to time in the papers.

There is still another point of interest to many and more especially to those who live in the coal territory of whom the writer is one. This is the rapid diminution of the culm of refuse piles which in former days were rightfully called "eye sores," but which in latter years have proved to be veritable "bonanzas."

During the early days of mining the marketable, or what was considered consumable, coal was prepared in



A Culm Pile Being Worked Over and the Larger Sizes



TYPE OF CYLINDRICAL BOILER USED IN THE EARLY DAYS. MANY OF THESE BOILERS ARE STILL IN USE AT THE OLDER MINES, BURNING PEA OR COARSER FUEL

the sizes now known as lump, broken, egg, stove, and a little later, a small quantity of chestnut. While the sizes termed pea and chestnut had to be made in the process of preparing the coal for market, they could not be sold. Consequently, they went to the culm pile, together with what is now known as the buckwheats, barley, rice and dust, there to remain as refuse until improvements in boilers and steam engineering created a demand for the smaller sizes.

These culm or refuse piles mountain high, covering thousands of acres of ground, containing millions of tons of what in later years proved to be the very best coal for steaming purposes, were the accumulated rejections of the early mining days.

PREPARED FOR MARKET. THE "MUD" DOES NOT SHOW IN THIS PICTURE

APPEARANCE AFTER CULM PILE HAS BEEN WORKED OFF

A history of boiler improvements, boiler specialties and advances in steam engineering with reference to economy in the use of fuel covering the past and present years of coal mining, would make an extremely interesting article in itself.

Fifteen or twenty years ago when it became known that the refuse in these piles contained as much carbon and consequently as large a heat content as the larger sizes of the then marketable coal, improvements in boilers and grates paved the way for the demand for the smaller sizes. The demand being thus created, the coal operators by means of suitable changes in the breakers, etc., perfected the means of preparing the buckwheat, barley and rice sizes for the consumer. They then went back to these culm or refuse piles and by suitable reworking methods, secured large quantities of the smaller sizes therefrom.

Twenty years ago anyone could buy all he wanted of these culm piles for 10c. a ton. The writer well remembers that his company in 1889 bought a culm pile at that price, made the necessary changes and additions in the boiler plant, added more units and successfully burned this refuse.

Looking over the anthracite fields now, anyone can see

PICKING COAL FROM A CULM BANK

WORKING OVER A CULM PILE

that these vast culm piles are rapidly diminishing, and it is safe to predict that in ten years or possibly five years all will be gone except what is called "slush" or "mud"—that which has passed through screens with $\frac{3}{32}$-in. meshes.

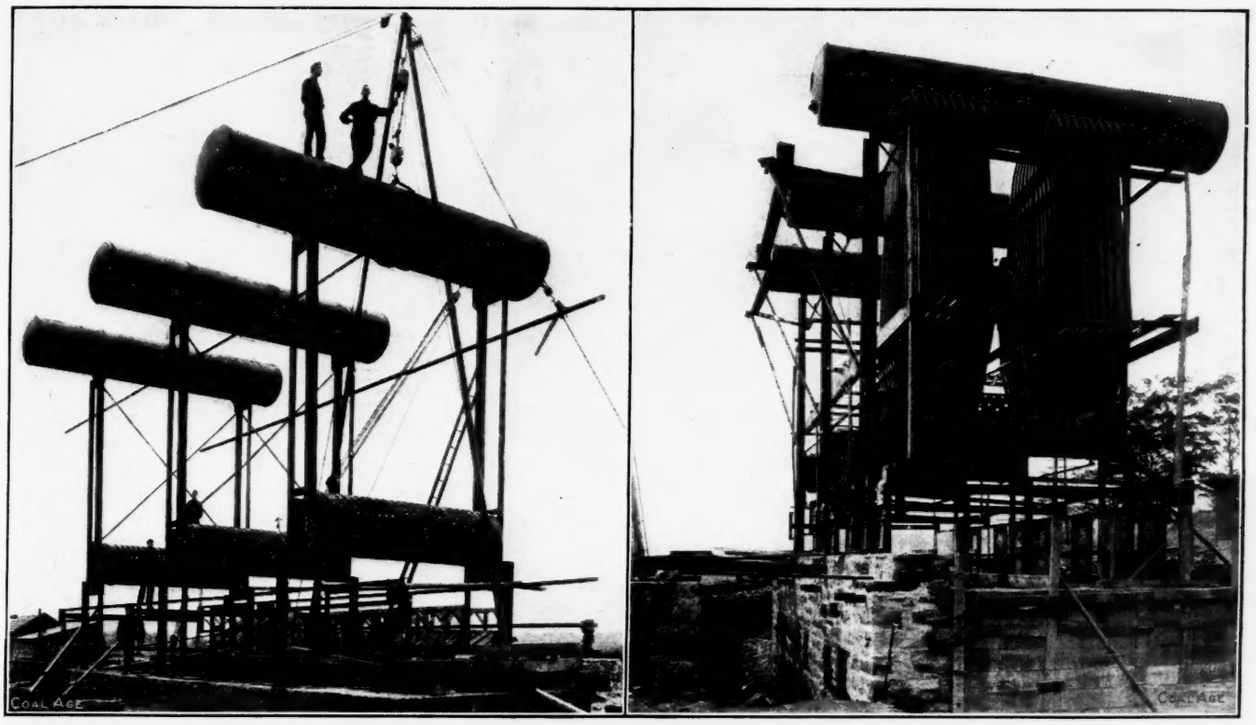
Many will affirm that this slush or mud is worthless and cannot be used for fuel under boilers. This is not true, for it has been found that there is as much or nearly as much carbon in this slush as there is in the buckwheat, barley and rice sizes. It is safe, therefore, to predict that this slush or mud can and will be used for steam making, so that eventually nothing will be left of the old culm piles and as no new ones are being created, nothing will be wasted on every ton of coal brought to the surface. Sooner or later also bony coal or what is part coal and part slate will be crushed, mixed with the slush or "fine stuff" and used for fuel in making steam.

To do this is purely a question of furnace design, proper ratio of grate area to heating surface, a low percentage of air space in the grate, high ash-pit pressure, balanced stack draft conditions and a stoker suitable to handle or feed the "fine stuff" into the furnace. These conditions will all be worked out by the boiler, grate bar, forced draft and stoker manufacturers and indeed one large boiler concern is now preparing special plans along these lines.

Seven to 10 years ago grates with 20 to 30 per cent. air space, employing a forced-draft pressure of ½ in. water in the ash pit, was the general rule. Today, grates with 4, 5, 6, or even up to 10 per cent. of air space with ash-pit pressures ranging from 3 to 5 in. of water-gage are being adopted and used.

It is interesting indeed to trace the path of improvements from the plain cylindrical boilers, as used in the mining regions years ago, fired with lump and broken coal and employing natural draft, down to the modern water-tube boilers burning buckwheat, barley and rice sizes with forced and balanced draft. What improvements are to come later in order to burn slush and mud with "bone" ground down to slush size, will be far more interesting, and these improvements are not far distant either.

In many cases manufacturers and coal operators, who have old boiler plants in operation consuming high-grade fuel, would like to burn that of a lower quality. They believe, however, that they cannot do this with the present boilers, and, of course, do not wish to go to the expense of installing those of a more modern type. They need not believe, however, that their condition cannot be improved, for this is in many cases perfectly possible. Many others, finding themselves in the same predica-



THREE MODERN WATER-TUBE BOILERS IN PROCESS OF ERECTION. THESE BOILERS BURN REFUSE AND ARE EACH EQUAL TO 30 TO 40 OF THE CYLINDRICAL TYPE ILLUSTRATED ABOVE, IN STEAM CAPACITY

ment, have derived great benefit from certain changes which have been made in their old boiler plants, giving either increased power or a reduction of expenses through the use of lower grades of fuel.

Meeting of American Mining Congress

This society meets for its 16th annual session at Philadelphia, Penn., Oct. 20-24. The prepared addresses will be printed and distributed among the members of the convention at the first day's session. Each author will be given 10 min. to make any supplementary statement. The subject will then be open for discussion. Among the important questions to be discussed are safety, workmen's compensation, mine taxation, the Alaska situation, Federal aid for mining schools, mining investments, revision of mineral land laws and conservation of coal resources. The mining exposition will contain exhibits of the various kinds of machinery used in and about mines.

A New Gasoline Rock Drill

The advantages of the power-operated rock drill are obvious, but for small jobs or temporary work its shortcomings are many. The expense of installing boilers, air compressors and the necessary pipe lines is frequently sufficient to exclude rock drills from work and cause a reversion to hand methods.

The Rice Gasoline Rock Drill Co., of Philadelphia, has just placed upon the market a machine which, it is

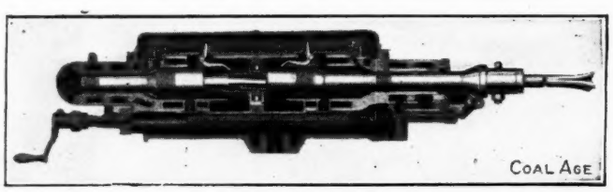
THE NEW DRILL UPON TRIPOD

claimed, is as rapid and reliable in action as the air drill, and has the advantage of being self-contained.

The constructural principle involved in this machine is simple and easily understood. The drill, which is mounted upon an ordinary tripod or bar, is practically two two-cycle, three-port engines, opposing each other, the piston rod, carrying two pistons, oscillating backward and forward between the impact of alternate explosions upon either end.

The rapidity of operation is at all times under control of the drill runner. This is of great advantage in starting a hole, particularly if the drill does not deliver its blow exactly perpendicular to the rock surface.

Ignition is accomplished by an electric sparking de-



SECTIONAL VIEW OF GASOLINE ROCK DRILL

vice, which, as well as the pump for the circulation of jacket water, is actuated by the plunger. Lubrication is automatic, the cylinder oil entering with the fuel.

The moving parts of this drill are few. It has been subjected to long and severe tests under adverse weather and rock conditions before being placed upon the market. It is the firm belief of the makers that it will give a satisfactory account of itself under any and all conditions for which it is intended.

Oklahoma's Coal Output

The total production of coal in Oklahoma in 1912, according to E. W. Parker, of the U. S. Geological Survey, was 3,675,418 short tons, valued at the mine at $7,867,331.

The coal areas of Oklahoma belong to the Western Interior coalfield. They lie entirely in the eastern and southeastern parts of the state, forming the connection between the Kansas field on the north, and the Arkansas field on the east. The principal developments are in the southern portion of the field, in what was formerly the Choctaw Nation of the Indian Territory, and is now included within Haskell, Latimer and Pittsburg counties. The total area underlain by workable coal is estimated at 10,000 square miles. The coals, of which there are ten or more beds, range from a medium grade to a high-grade bituminous, some of the latter approaching semi-anthracite. Some of the higher grades have coking qualities, but efforts to make coke in the beehive ovens, constructed for that purpose, have not been conspicuously successful.

Diminished production of petroleum and natural gas in the Mid-Continental field is reflected in increased production of coal in Oklahoma, and a substantial advance in prices. The quantity of coal produced increased from 3,074,242 short tons, valued at $6,291,494 in 1911, to 3,675,418 tons, valued at $7,867,331 in 1912.

The record of 1912 exceeded that of the previous maximum output (that of 1907) by nearly 33,000 tons. Compared with 1911 it showed a gain of 601,176 short tons, or 19.6 per cent. in quantity, and $1,575,637, or 25 per cent. in value. The average price per ton advanced from $2.05 to $2.14.

The year 1912 was the first in a decade to encourage the coal-mine operators of Oklahoma, and the other Southwestern states. For ten years the industry in those states had been kept practically at a standstill, the output in 1911 being just about the average for the decade ended in that year. The production in 1912 exceeded that average by nearly 20 per cent.

The only assignable reason for the increased activity appears to be, as already stated, the diminution in the supply of natural gas and fuel oil in the market tributary to Oklahoma coal. Competition with coal from other states, particularly Colorado and New Mexico, is keen.

In 1912 the average number of days worked was 174, the largest number in recent years excepting during the boom period of 1907. The general average of working time among the bituminous mines was 223 days, and the number of men employed was 8785.

In 1912 out of a total of 3,675,418 tons produced, 3,175,455 tons, or 86.4 per cent., were shot off the solid. The quantity mined by machine was relatively small, amounting to 259,719 tons, or 7.1 per cent.

The death rate in Oklahoma in 1912 was unusually high, owing principally to an explosion of gas in the San Bois mine, at McCutcheon, on Mar. 23, which resulted in the loss of 73 lives. According to the Bureau of Mines, the total number of fatal accidents during the year was 99, all being underground. Seventy-seven were due to gas and dust explosions; 11 to mine fires, and 7 to falls of slate and coal. The death rate per thousand was 11.27, and there were 37,125 tons of coal mined for each life lost.

EDITORIALS

The contest for supremacy between approved types of safety lamps and the portable electric mine lamps that have forged their way to the front within the past two years, is still undetermined. The open lamp or torch is a recognized menace in all mines operating in gaseous territory; but, before the electric lamp can fully supplant the safety lamp, in mine work, a reliable means of detecting the presence of dangerous gases in the mine air must be devised. Let someone get busy.

The Tuberculous Miner

Dwight E. Woodbridge, in his bulletin "Sanitation at Mining Villages in the Birmingham District," says that "among miners, tuberculosis alone annually takes many times the number of lives that are lost in accident." An important statement, if true, but we are convinced he cannot prove it. The U. S. census statistics in 1900, which are the most recent reported, show that 1.21 miners and quarrymen per thousand died of consumption in that year. The death rate in 1911 from accidents in all U. S. mines was 3.82 per thousand. The census statistics, covering such a few states, and only those where mining is unimportant, do not prove anything, nor do such unsupported statements as those of Mr. Woodbridge.

He quotes the tubercular death rate of the city of Birmingham in proof of what he says, though we are convinced all are not miners in that city. Yet he can only show 2.77 deaths per thousand at that point, and as our readers know from English experience, quoted in these columns, coal and iron miners have a low death rate from tuberculosis as compared with other occupied males. Another reason why Birmingham is not typical of mining towns, but probably has a higher death rate, is that "the mortality curves for tuberculous and nontuberculous diseases are highest in large towns," as Sir Thomas Oliver stated before the fifteenth International Congress of Hygiene and Demography. He declared further, "These diseases bear a distinct relationship to the size of the town, the density of the population and the social well-being of the people." Mining towns are small, their population relatively scattered and all the men make good wages.

So we believe that the miners in villages are not likely to be as tuberculous as the citizens of Birmingham, and we think that Mr. Woodbridge has been merely guessing. Sometime we will learn whether his guess is right, but at present writing every indication proves he is wrong, and not a single fact, not even those he advances, prove that he has a foot on which to stand.

That there is such a disease as miner's consumption has been abundantly proved. Where conditions are favorable, as on the Rand in the Transvaal, its ravages may be terrible, especially where Kaffirs, who are new to the disease, are engaged. In England the tin and copper miners are said to be seriously infected, but the direct and indirect action of the returning miners from South Africa on the death rate of these workingmen remains to be determined.

Until we know definitely the true menace of miner's consumption it is better for us to use statements which will express the uncertainty of our knowledge.

The Bureau of Mines as a National Force

The Bureau of Mines has been in existence long enough that we have begun to regard its activities as almost preordained by circumstances. We hardly realize that had it been directed by other and less enterprising heads, an entirely different organization might have been created.

It might have been a purely scientific body to determine principles and leave them as such for the more enterprising managers and engineers to apply to their needs. This they would have been slow to do because the expenditures would probably have been resisted by those who, though they hold the purse strings, often know little about mining. These men must be reached not through bulletins but by the public press, not so much by logical argument as by a benign atmosphere. This beneficent influence, so greatly needed, the Bureau has created, and as a result the laggard but generous spirits of the industry have been directed toward a consideration of the needs of miners so that they have followed closely on the wake of those who were first to set the example. As for the more sordid capitalists, public sentiment is now forcing or will soon compel them to follow the lead of the others, and state laws will accomplish what conscience and social pressure cannot perform.

Had it not been for its active work and energetic propaganda, the impress of the Bureau of Mines on the coal industry would have been less marked than that of any organization of like kind in any European country, for most of these have administrative powers which enable them not only to recommend but to enforce. In Great Britain, as in the United States, there is no such power granted to the experimenting faculty but the investigating authorities and the chief inspector being immediately subject to one common head, the Home Office, there is an organic unity between determinatory and administrative powers which makes both one. In the United States, there is no such unity, yet the Bureau of Mines has obtained a most commanding position largely because of its diplomatic combination of mere scientific result with institutional activity. To use an expression borrowed from another sphere, its work as laid down by its officers is not merely to propound dogma but also to engage in active ameliorative work.

The mine-rescue cars, the first-aid training, the gas- and oil-well conference, the demonstrations of explosions at the experimental mine and in galleries, have served to turn mere theories into an actual force and have given the Bureau a power to do by suasion and example that which by virtue of the constitution it cannot perform by law. Thus many excellent practices used by a single corporation or by a group of companies have been diligently spread over the country by the Bureau. Without this

careful sowing, the results effected might have been delayed many long years. Wherever the Bureau has found systems worthy of imitation, it has followed them itself and urged their adoption all over the United States.

It must always be remembered that it is hard for any national bureau to introduce some entirely new method involving the expenditure of large amounts of money until some company has had courage and philanthropy enough to adopt that improvement. If ten years ago, a national body had urged the introduction of septic tanks and sewerage in every camp, it would have faced a fierce opposition. Today by showing what enlightened corporations are doing and have done, the sanitation of mining camps will take a rapid step forward.

Great credit should be given to the Bureau for its energy and resource in extending the knowledge of safety and sanitary provisions. It is true that in much it has merely followed the work of the anthracite companies and of the subsidiaries of the U. S. Steel Corporation, but no little credit is due to those who make local conditions national or transplant foreign methods on native soil.

We believe the institutional work of the Bureau will eventually wane when it has served its purpose. Already in the anthracite regions, the coal companies are so well fitted with rescue teams and apparatus and the first-aid men are so well trained that the Bureau cannot do the work there that can be done, for instance, in Oklahoma, Kansas or Tennessee, or even in the bituminous fields of Pennsylvania.

At the Brookside explosion, the Bureau of Mines was almost entirely unrepresented, having only two men and a cook. There are some who think that this revealed the Bureau in an unfavorable light; personally we think it demonstrated that the ability of the anthracite region to take care of its own rescue work had been recognized by the Bureau. Thus the showing was a credit to the anthracite coal companies and no disparagement to the governmental force.

And we think eventually every part of the coal territory will be able to protect itself from disaster, and will have, as in all European countries, its central rescue stations instituted to serve far smaller radii of action than the cars of our Bureau of Mines. It is time for such an organization to be formed in every section of the country, without national aid. Whether an automobile or railroad car is needed should be determined from local conditions but one or other should be owned by every group of mines and should be maintained by all mines near-by, large and small, whether they possess helmets and hire trained men at their works or not, for one squad of men is not enough to do the rescue work of a large mine.

Unless the Bureau of Mines undertakes to teach mining as well as first-aid, it cannot furnish sufficient employment so that it can assemble as many trained men as were mustered at Brookside. It cannot, therefore, do more than supplement rescue work and first-aid, and must be content to be last on the field when explosions and other accidents happen. So that in well developed fields, its largest service will be scientific.

The most desirable rescuemen are those who have worked in the mines where the disaster occurs and the professional men of the Bureau will always lack that intimate knowledge of the intricacies of individual mines which is enjoyed by the men who work therein. This is markedly true of the anthracite region.

But even if the Bureau ultimately loses its active side and disposes of its cars, ceases its demonstrations and becomes purely scientific, nevertheless it is worthy of the greatest of honor for having spread a movement which will later continue and develop by its own internal force. That credit is rightly due to Joseph A. Holmes and his colleagues.

Experimental Explosion at Bruceton Mine

We publish today G. S. Rice's interpretation of the mysterious kick-back of the recent experimental explosion. Though he does not say so, we believe that it is his opinion that the explosion reached a certain maximum violence, died down and then, near the Taffanel barrier, but at its inby edge, developed a new force and drove the cars back into areas of inferior pressure. It is a reassertion of the oft-repeated declaration that every explosion is not a single phenomenon, but a series of culminations. The space curve of pressure is said to be, not a line gradually rising till a maximum is reached, but a series of waves as the violence rises and falls along the heading. We suppose that Mr. Rice will justify his conclusion by comparing the low pressure found 750 ft. from the portal with the pressure ten times as great at 550 ft., only 200 ft. away.

We agree with him that a mere vacuum, doubtless not by any means complete, could hardly impel cars with anything like the force with which they were thrown during the explosion. That statement we have already made. But if the new focus was near the Taffanel barrier, we wonder why the cars most remote from that point moved furthest inward and otherwise evidenced the most violence.

Surely the flame did not gain in volume or the blast in force as they together traveled backward through the vitiated air; in fact, we doubt seriously whether the flame ran back at all. Moreover, why did not the cars shoot outward with the first blast? The torn shelving near the inby car in the entry starts from the point where the car was standing, as if the loaded wagon did not go outby, before it was hurled inward.

Somehow, we have a hankering after a belief in John Verner's theory, and we hope some time that the Bureau will find out, not only when the cars go in, but when they leave their original stations, and whether they travel both outby and inby. We are prone to believe that the inrush really accompanies the initiation of the explosion, is more violent near the originating point, travels along a separate path from the explosion and is not a mere vacuum rush, but is the result of the pressure of the explosion on the intaking current.

Experiment only will answer, and we hope the Bureau will make tests which will determine this moot point. Meantime we hope no one will be so dogmatic that he cannot later with grace reverse his own decision, for the problem is not easy and the answer is as yet far to seek. The advocates of the "vacuum" as a sufficient cause may well believe it could damage cars and track as stated. The only difficulty is to grant that a current traveling horizontally could have such *lifting* power.

SOCIOLOGICAL DEPARTMENT

Safety Precautions of the Consolidation Coal Co.

By A. W. Hesse*

The "Safety First" movement in the Fairmont region, more particularly with the Consolidation Coal Co., received an impetus at the time of the Monongah explosion, which has kept it going ever since.

This company has spared no expense to introduce devices, or machinery to protect its employees. Arrangements were made at all its mines to introduce steam to keep down the dust; firebosses were established at more than half the operations because oil and gas wells had been drilled in the neighborhood of the workings, although most of these latter were considered nongaseous. An outside field man now follows the drilling of all wells through the company's coal; also, arrangements were made to have all drilling companies protect the outer casing with cement where it passes through the coal seam.

Adjoining operations are no longer connected, but arrangements are made, when the workings of two mines approach each other, whereby they can be readily and quickly connected if desired.

The company has never relied entirely on the state for the inspection of its mines; it employs a chief inspector and three assistants continually who report on safety conditions inside, and make recommendations for improving them. Later a superintendent of mining was established, who with an assistant, continually visits the mines, instructing the foreman and men how to mine coal properly besides supplementing the work of the inspectors.

All these men are trained in the use of rescue helmets, having taken the course at Pittsburgh under the Bureau of Mines. Five sets of helmets, together with necessary charging apparatus, are kept at Fairmont, where they are tested every week by competent men, trained for this work. These men come under the Testing Department and besides keeping the rescue apparatus ready for service, they visit the mines liberating, or likely to liberate any gas, sample the air, analyze it and report the percentage. They also take the humidity on these visits and report on same, in order to determine when to introduce the steam.

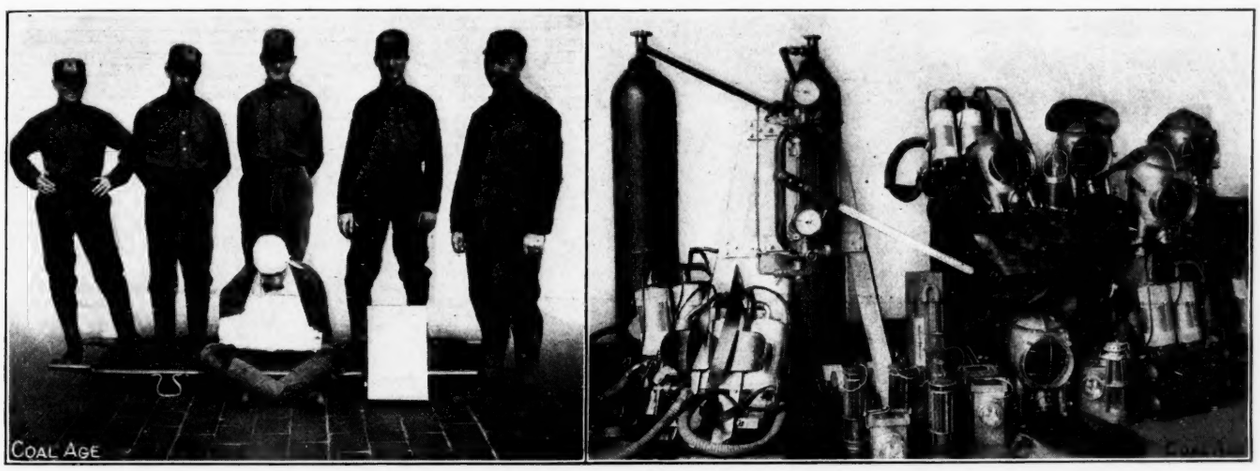
Emergency Outlets

In the past few years the company has gone to large expense in making extra openings for emergency outlets. Besides having completed one 195-ft. shaft and the present sinking of another 250-ft. deep, an adjoining property was purchased for the 136-ft. shaft outlet on it. Shotfirers are employed at a number of the mines to increase safety precautions, especially for untrained miners.

The value of this "Safety First" movement is better illustrated by actual figures. The decrease in the death rate per 1000 employees for 1912 over 1911 was 34.9 per cent., whereas the tonnage per death for 1912 was double that for 1911. The death rate for this company for 1911 was more than 16.4 per cent., and more than 45.6 per cent. less in 1912, as compared with the 1911 rate for the state. The tonnage per death was more than double that of the entire state.

The first-aid movement has not had quite the attention given it in other fields, due, perhaps, to the fact that the company's many doctors can reach the scene of accident so quickly; yet the movement has not been entirely ignored.

The accompanying picture shows the team which represented the West Virginia Division of the Consolidation Coal Co., at the recent meet held at Pittsburgh.



*Assistant engineer, Consolidation Coal Co., Fairmont, W. Va.

The presence of blackdamp, a mixture of carbon dioxide and nitrogen, will often neutralize the effect of firedamp on a flame. Analyses of mine gas, which gave only a faint cap when tested with a safety lamp, have shown 4 per cent. of methane mixed with blackdamp. When testing with a lamp, remember that the flame is not clear in lamps that have been burned some time in a dusty atmosphere as in lamps burned but a short time in clear air.

The Muckle Cup Contest

SPECIAL CORRESPONDENCE

With 18 teams competing, presenting remarkable demonstrations of primary relief work, the fifth annual inter-company first-aid contest of the American Red Cross was held on Sept. 27, at Valley View Park, Inkerman. The chief prize in this interesting competition is the Muckle silver loving cup, donated in 1909 by Mrs. John S. Muckle, of Philadelphia, as a memorial to her husband. To secure permanent possession of the trophy, it must be won three consecutive times. The winners to date are as follows:

Wilkes-Barre, Oct. 2, 1909, Law Shaft, Avoca, Pennsylvania Coal Co. Valley View, Sept. 17, 1910, Woodward Colliery, Lackawanna Coal Co. Valley View, Sept. 16, 1911, Brisbin Colliery, Lackawanna Coal Co. Valley View, Sept. 28, 1912, Pine Brook Colliery, Scranton Coal Co. Valley View, Sept. 27, 1913, Old Forge Breaker, Pennsylvania Coal Co.

The contest was open to all first-aid teams of the operating companies of the anthracite region, and the 18 teams represented the Pennsylvania, Hillside, Temple, "Lackawanna," Jermyn and Scranton Coal companies. The event is annually the big feature of first-aid work in northeastern Pennsylvania and the teams competing are those making the best scores at previous company meets.

The contests were conducted under the direction of Dr. F. F. Arndt, of Scranton, who has charge of the first-aid work of the Pennsylvania and Hillside companies. The judges were Dr. W. S. Fulton, of Scranton; Dr. John W. Grant, of Carbondale; and Dr. J. A. Singer, of East Stroudsburg. The other officials were: Secretaries—F. D. Conover, secretary to Capt. W. A. May; J. S. Angler, secretary to A. F. Law; Edgar Weichel, timer.

In previous years, the War Department has sent army physicians to Valley View to judge the contests, but this year it was reported that no mileage was obtainable. Major Patterson had been detailed to supervise the event, but his work as doctor of the field work of the American Red Cross drew him away from Washington, and Major Lynch was substituted. A death in the family

TEAM FROM OLD FORGE BREAKER, PENNSYLVANIA COAL CO.

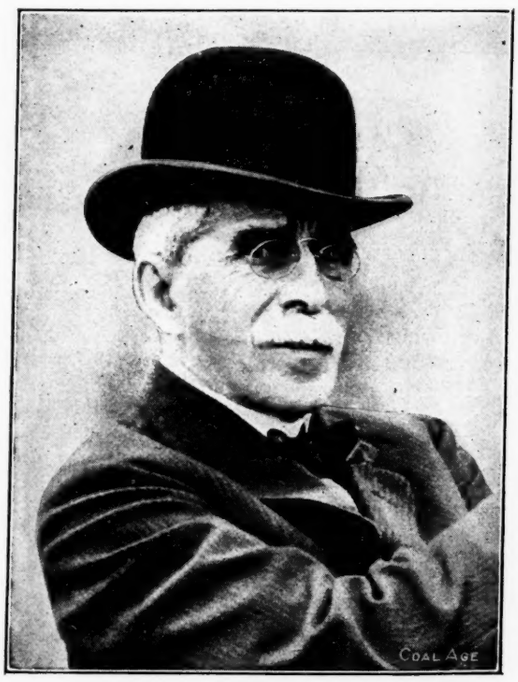
(The winning team in the fifth event. M. Ballentine, captain; M. Quinn, T. Cranston, H. McGerrity, S. Sibley and W. Bennett, subject.)

FORTY FORT COLLIERY TEAM IN FOURTH EVENT

(Injured spine and broken left forearm. P. Williams, captain; J. Casparen, subject; J. Jim, W. Jones, F. Romenkoski and I. Hochreiter.)

OLD FORGE BREAKER TEAM, PENNSYLVANIA COAL CO., AND JUDGES

(The team on the bench was the winner of the Muckle cup at the Red Cross meet, Valley View, Sept. 27, 1913.)



CAPTAIN W. A. MAY, GENERAL MANAGER PENNSYLVANIA COAL CO.

(Said to have introduced first-aid methods in the American anthracite field.)

ily of the latter this week prevented his being present, and the department was not represented.

Two of the events were run off before the noon recess, when lunch was served by the companies interested. The problems worked out by the teams were framed by physicians of the War Department at Wishington, and sent to the park in sealed envelopes. There were five events, and the cup award was on the general average. The events were as follows:

1. One-man event. A miner has been injured by a fall. There is an incised wound on the right knee, with little bleeding, and a lacerated wound on the palm of the left hand, which is bleeding profusely. Treat appropriately and carry 50 ft. Time allowed, 8 minutes.

2. Two-man event. A man is found unconscious, lying with his abdomen across a live electric wire. Rescue the patient and give appropriate treatment. Time allowed, 10 minutes.

3. Three-man event. A man has his head, face, neck, shoulders, arms and hands burned, following a gas explosion. Treat the case. Time allowed, 15 minutes.

4. Full-team event. A man is found with his spine injured—apparently broken. The left forearm has sustained a simple fracture of both bones. Treat the patient and carry 50 ft. Time allowed, 20 minutes.

5. Full-team event. A man has been injured by a fall of coal and slate. There is a compound fracture of the right forearm about the middle. His left thigh has a simple fracture 6 in. above the knee. The back of his left hand has a deep cut, which is bleeding profusely. There is also a lacerated wound of the right cheek. Treat the case and carry 50 ft. on an improvised stretcher. Time allowed, 15 minutes.

The participating teams follow:

1. Sterrick Creek Coal Co.—Isaac Davis, captain.
2. Fernwood Slope, Butler Colliery, Hillside Coal & Iron Co.—James R. Pollard, captain.
3. Law Shaft, Pennsylvania Coal Co.—William Creedon, captain.
4. Pine Brook, Scranton Coal Co.—John Igall, captain.
5. Nanticoke Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—William Hill, captain.
6. Brisbin Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—John Pierce, captain.
7. Lackawanna Colliery, Temple Iron Co.—Harry Saxe, captain.
8. Mt. Lookout Colliery, Mt. Lookout Coal Co.—George Bumby, captain.
9. Old Forge Breaker, Pennsylvania Coal Co.—Moses Ballentine, captain.
10. Erie Colliery, Pennsylvania Coal Co.—Martin Cawley, captain.
11. Storrs Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—David Edwards, captain.
12. Forty Fort Colliery, Forty Fort Coal Co.—Fuller Williams, captain.
13. Northwest Colliery, Northwest Coal Co.—Charles Seipher, captain.
14. Sloan Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—William King, captain.
15. No. 2 Shaft, No. 1 Colliery, Pennsylvania Coal Co.—C. F. Beachem, captain.
16. Jermyn Colliery, Jermyn Coal Co.—Charles Llewellyn, captain.
17. No. 5 Shaft, No. 6 Colliery, Pennsylvania Coal Co.—Peter Hoolihan, captain.
18. Bellevue Colliery, Delaware, Lackawanna & Western R.R. Co., coal department—John M. Jones, captain.

SOME OF FIRST-AID TEAMS AT WORK AT RED CROSS MEET
(Fifth and crowning event.)

A NEAT SPIRAL BANDAGE—THE HARDEST OF ALL TO MAKE
(Winning team performing fifth event.)

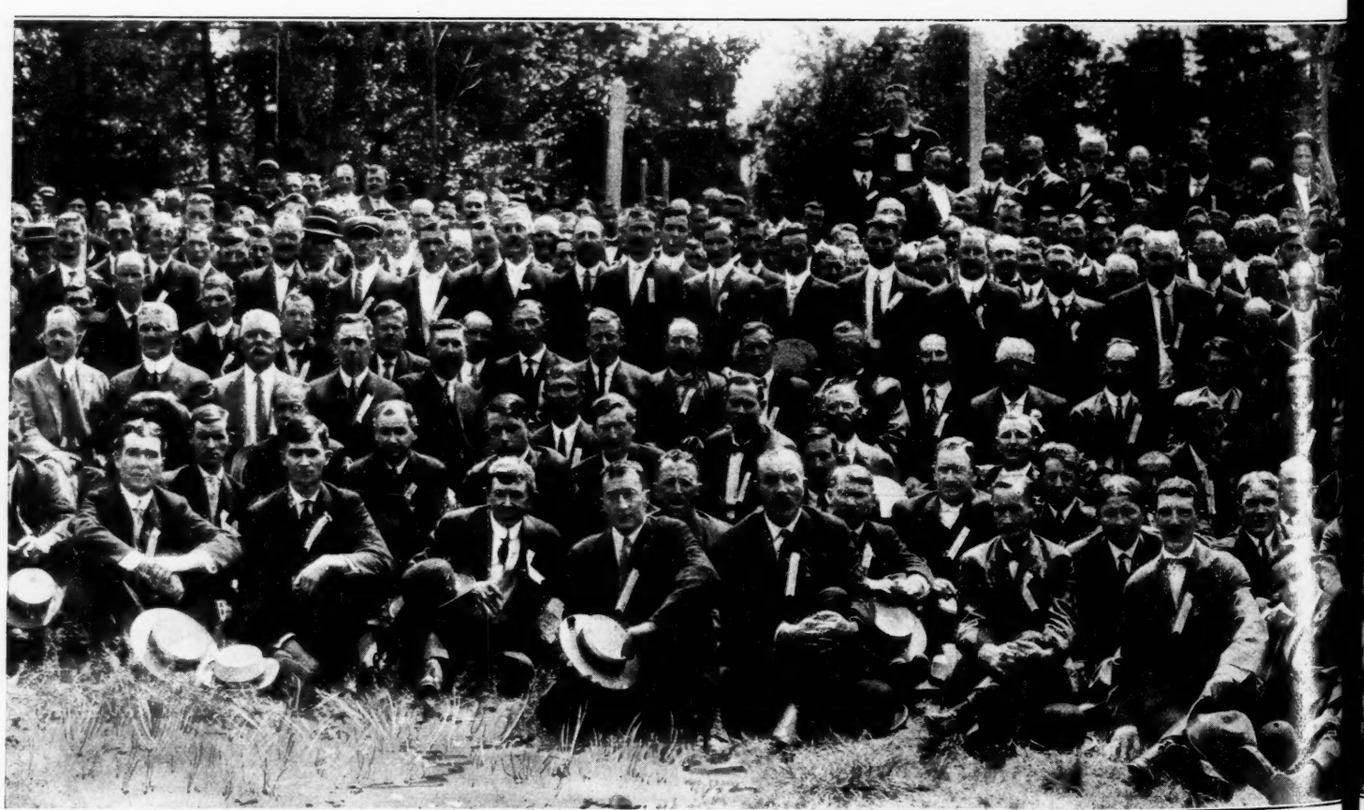
TEAM OF NO. 5 SHAFT, NO. 6 COLLIERY, PENNSYLVANIA COAL CO.
(Fifth event. Victim is bandaged for lacerated wound of right cheek, compound fracture of right forearm, a cut in the back of the left hand and a simple fracture of left thigh above knee.)

The standing of the teams in the different events was as follows:

Team	1	2	3	4	5	Average
Sterrick Creek	94	95	100	95	100	96⅛
Fernwood Slope	95	98	100	95	100	97⅜
Law Shaft	100	95	96	97	93	96⅛
Pine Brook	95	97	97	100	94	96⅜
Nanticoke	100	96	100	100	91	97⅛
Brisbin	98	88	96	97	89	93⅜
Lackawanna	95	98	94	100	91	95⅜
Mt. Lookout	90	96	94	100	92	94⅛
Old Forge	100	96	96	100	100	98⅛
Erie	100	97	91	98	100	97⅛
Storrs	98	98	94	96	90	95⅛
Forty Fort	100	96	98	98	95	97⅛
Northwest	80	85	90	96	90	88⅛
Sloan	85	100	95	96	97	94⅜
No. 2 Shaft, No. 1 Colliery	98	100	95	90	89	95⅛
Jermyn	90	95	98	96	88	93⅜
No. 5 Shaft, No. 6 Colliery	89	100	100	98	97	96⅛
Bellevue	92	90	96	96	100	94⅛

The prizes were presented by Dr. J. A. Singer, of East Stroudsburg, instructor in first-aid for the D. L. & W. R. R. Besides the Muckle Cup, each member of the winning team was given a bronze Red Cross medal, from the American Red Cross.

Third Annual Outing of the Lehigh



OFFICIALS AND EMPLOYEES OF THE LEHIGH VALLEY

Valley Coal Company Social Association

Coal Co. Met at Hazle Park, Penn., Aug. 23, 1913

Rescue Contest of the Vandalia Coal Company

The third annual first-aid contest of the Vandalia Coal Co. was held in Mahan's skating rink, Linton, Ind., Saturday evening, Sept. 13. A passageway similar to an entry in a mine was erected. Obstructions were placed in this passageway, and the various teams, fitted with

OTHER VANDALIA TEAMS THAT TOOK PART IN THE CONTEST

breathing apparatus, were compelled to carry a man over these obstructions on a stretcher. Injuries, such as fracture of the thigh and other limbs, burns, electrical shock, etc., were demonstrated and treated by the different teams.

Six teams entered the competition, and the rescue corps from Mine No. 9 received the highest percentage, thus winning first prize. This team was composed of Charles Dodge, captain; Jack Brown, John Parks, Thomas Parks and Dave Beaty. This same team was sent to Pittsburgh to compete in the national meet held there Sept. 22-24.

During the evening William Houston, president of District No. 11, U. M. W. A., delivered an interesting address on "The Desirability of First-Aid Among the Miners." Mr. Houston stated that anyone who looked upon the first-aid movement with scorn and ridicule did so out of ignorance, and that Linton, which is the best coal-mining city in Indiana, should be proud that this great movement originated there.

SOME MEMBERS OF THE VANDALIA RESCUE TEAMS

The Vandalia Coal Co. is the pioneer of mine-rescue work in the Middle West, having adopted first aid three years ago.

Mine-rescue car No. 3, of the U. S. Bureau of Mines, with Luther Floyd in charge was in Linton at the time and the crew gave training in the use of breathing apparatus to a number of miners.

The following men acted as judges of the contest: John Talbott and Luther Floyd. The various teams of the Vandalia Coal Co. were trained under the direction of Dr. A. F. Knoefel.

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Coal-Dust Explosions

A lecture arranged by the British Association was delivered by Sir Henry Cunynghame, K. C. B., the chairman of the late Royal Commission on Mining Accidents and of the Eskmeals Dust Explosions Committee. His subject was "Explosions in Coal Mines and the Means of Preventing Them." Sir Henry adopted simple language, deeming it best not to presume an acquaintance on the part of his audience with the methods of working coal mines.

Coal, he explained, consists of the residue of the vegetation of bygone ages. The plants of which coal is composed were mostly ferns, many of which were of gigantic size. It contains woody fiber and seeds of a very resinous and inflammable kind. A pound of it when burned will give enough heat to raise about 9 gal. of water from 60 deg. F. to the boiling point, and has a work-doing power of one horse for about five hours; that is, it will raise 4800 tons weight to the height of one foot.

On coal we depend for domestic heating, gas-light, cooking, electric light, for means of locomotion by land and sea, and for almost the whole of our manufactures. This coal we waste in a most unjustifiable way. A common kitchen range burns more than a ton of coal a month—that is, about 75 lb. a day—an amount which if properly employed would cook for 1000 people.

The common gases found in mines are methane, which, roughly speaking, is like common coal gas, and is the gas given off from marshes; carbon dioxide, the gas given off from effervescing drinks; and carbon monoxide, a deadly poison. In common language they nearly correspond to firedamp, chokedamp and afterdamp. The first is capable of rendering air explosive, the second chokes you, and the third poisons you. Thus explosion, suffocation and poison are the dangers to which the miner is exposed.

METHANE WAS THOUGHT TO BE THE ONLY CAUSE

The old theory of mine explosions that they were caused by methane was the natural one, but Sir Henry explained the improbability of this theory and its utter variance with the phenomena of a coal-mine explosion, discussing the origin and development of the dust theory of explosions. Explosions of gunpowder were shown to be exactly analogous to dust explosions. In

the one case the oxygen in a condensed form is supplied to carbon dust at rest in a heap; in the other case oxygen in the gaseous form is supplied to a cloud of finely divided dust particles.

Speaking of the modern theories of mine explosions, the lecturer said death results not so much from violence, still less by suffocation, but almost entirely by reason of poisonous carbon monoxide. The employment of mine ventilation to sweep the mine free of gas has the effect of producing clouds of dry dust which is explosive. The remedies suggested for mine explosions are: (1) regulations as to the use of naked lights, electricity and blasting; (2) wetting the coal, which plan, although difficult to carry out, is effective and still will probably have to be used extensively; (3) incombustible dust. In order to understand the probable action of incombustible dust in impeding the ignition of coal dust, it is necessary to call to mind the kinetic theory of gases.

In reference to the experiments following upon the proposal of Mr. Garforth to spread incombustible dust in mines, it has been found that with three parts of stone dust to five of coal dust, the explosion is feeble; with four to six it is smaller still; with equal proportions it stops. It is highly probable, if the dust in a mine consisted of over 50 per cent. of incombustible matter, it would be almost impossible to explode it, except by a very large-scale explosion, which is in the highest degree unlikely to happen if the whole mine is treated from end to end with the incombustible dust.

Shock

By A. S. Snyder*

Shock, or collapse, is a depression of the vital functions of the whole system. The action of the heart becomes weak and there is a dilation of the blood vessels of the internal organs, so that an accumulation of the blood occurs in the interior of the body, and the amount of blood circulating near the outer surface and in the head is decreased to such an extent that it produces a profound depression of the nervous system.

Symptoms

Face is pale, anxious and pinched.

Eyelids droop; eyes are dull with dilated pupils.

The patient is stupid and takes no interest in what is going on or happening about him.

He may be partly or totally unconscious.

Breathing is feeble, and there is sighing and great thirst.

The pulse is feeble, fluttering, rapid and barely perceptible.

The skin is cold, the temperature subnormal.

When an injured person begins to get chilly and shiver, no matter how slight the injury, he is suffering from shock.

Treatment

Place in a position with the head low, so that more blood will flow to the brain.

Loosen all tight clothing, especially about the neck, wrists and waist, but do not remove more clothing than is necessary to examine and treat the injury thoroughly.

Cover patient with blankets, coats or brattice cloth if no blankets are immediately at hand.

If in a mine where safety lamps are used, apply heat by placing lighted safety lamps under the blankets or covering.†

If the victim is conscious, give him stimulants, such as aromatic spirits of ammonia, tea or coffee.

Rub the limbs to stimulate the circulation.

If unconscious, hold ammonia or smelling salts to the nose, and in severe cases apply artificial respiration.

When warmth is restored and the patient recovers from cold and chilly sensation, the treatment is successful.

*Instructor in First Aid, Cambria Steel Co., 1005 Somerset Ave., Windber, Penn.

Mining Exhibit at A. M. S. A. Meet

An interesting mining exhibit was held in the parlors of the Fort Pitt hotel. The Lungmotor was shown by the Life Saving Devices Co., Chamber of Commerce Building, Chicago, Ill., and attracted much attention. The apparatus is portable, little liable to get out of order and simple in operation. It is used for resuscitating the asphyxiated.

The Draeger Oxygen Apparatus Co., of Pittsburgh, Penn., demonstrated their well-known helmets and pulmotors. S. F. Hayward Co., of Chambers St., New York City, exhibited the Westfalia long- and short-time helmet outfits, of which nearly 100 are said to have been sold in this country.

The American Red Cross exhibited their dressings as also Johnson and Johnson of New Brunswick. N. J. Burroughs, Welcome & Co. showed their tabloid first-aid packages which are equally available for aviators and for mine use. They are light, compact and therefore easy to carry.

The Mannesmann Light Co., of 55 John St., New York City, made a fine exhibit of their CEAG lamps and the Koehler Manufacturing Co., of Marlboro, Mass., showed their safety lamps and igniters. The lamps give a light of 1.6 candle power. The Hirsch Electric Mine Lamp Co. had a complete exhibit of electric cap lamps and batteries. The Union Electric Co., of Pittsburgh, exhibited mine telephones, headlights, condulets, trolley clamps, and other electric supplies. The Western Electric Co. showed their complete line of mine telephones.

Itinerary of Federal Mine-Rescue Cars

Wilkes-Barre Car No. 1—Itinerary No. 2—Revised Sept. 3, 1913

At	Companies	1913 Arrive	Leave
Carbondale, Pa.....	Hillside Coal & Iron Co., Delaware & Hudson Co., Temple Iron Co., Scranton Coal Co., and several individual mines.....	Oct. 1	Oct. 17
Philadelphia, Pa.....	American Mining Congress.....	Oct. 20	Oct. 25
Peckville, Pa.....	Scranton Coal Co., Temple Iron Co., Delaware & Hudson Co., and several individual mines....	Oct. 27	Dec. 1
Olyphant, Pa.....	Delaware & Hudson Co., Scranton Coal Co., Temple Iron Co., and several individual mines.....	Dec. 1	Dec. 17
Dunmore, Pa.....	Price-Pancoast Coal Co., Pennsylvania Coal Co., and several individual mines.....	Dec. 18 1914	Jan. 23
Providence, Pa.....	Delaware & Hudson Co., Scranton Coal Co., Pierce Coal Co., and several individual mines.....	Jan. 24	Mar. 6

The Meet of the Susquehanna Interests

The allied Susquehanna companies have published a most complete score sheet, showing the team ratings at the elimination and final contests, and giving a list of the winners and a description of the various events.

The following figures are quoted:

Event	First Prize		Second Prize	
One-man	Hickory Ridge.....	95¾	Nanticoke No. 5 No. 2 Shaft	91
Two-men	Nanticoke No. 5 No. 4 Slope	87	Luke Fidler Outside.....	86
Three-men	Cameron Outside.....	97	Pennsylvania.....	95
Full team	Scott Outside.....	96	Pennsylvania.....	95¾

†The more usual practice is to extinguish the lamps. On this matter discussion is invited.—Ed.

DISCUSSION BY READERS

Starting Fan after Explosion

Letter No. 2—Assuming that an explosion has occurred in a mine and the force of the blast has damaged the fan so that it must be repaired before it can be used, the question of starting it up again before the mine has been examined is a serious one. My answer to this question is an emphatic "No."

Experience has shown that there is always more or less unburned marsh gas remaining after an explosion. Miners who have survived an explosion in a mine state that there is usually a reflex wave following the first blast. The result is that most of the oxygen of the mine air is consumed, leaving the atmosphere in the mine, largely devoid of power to support life or flame. Frequently, there are piles of hot dust, and the timbers and ribs of the entries are coated with dust.

In this condition, air from the workings not traversed by the explosion furnishes enough oxygen to start numerous small fires in different parts of the mine. The effect of starting up the fan under these conditions, would be to increase the draft and spread the fire. Moreover, the circulation through the mine would render the gas accummulated in portions of the workings highly explosive and bring this in contact with the fire. A second and more disastrous explosion would certainly follow. This is my reason for saying that the fan should not be started until the helmet men have penetrated far enough into the mine to ascertain its true condition.

FIREBOSS.

Republic, Ala.

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Letter No. 3—I was much interested in the question of Ralph W. Mayer, COAL AGE, Sept. 20, p. 430, referring to the danger of starting a fan that had been thrown out of commission by an explosion, before correctly ascertaining the condition of the mine. While it assumes the worst conditions that could arise, the question is a good, practical one, and, for the benefit of those less familiar with mining conditions, should be discussed thoroughly from a practical standpoint.

There is always the danger of a second explosion following the first, on the restoration of the air current. This is liable to occur whether or not the fan is started. Those familiar with the situation know that ventilation in the mine is always more or less deranged by the destruction of stoppings, brattices, doors, etc., throughout the mine. Frequently, gas feeders and combustible material have been ignited by the flame of the explosion. It must not be thought for a moment that all of the air or available oxygen in the mine has been consumed by the first explosion which belched flame and smoke from the mine openings. It is usually the case that more or less pure air exists in portions of the mine, while other portions are filled with the carbon monoxide, carbon dioxide and nitrogen of the afterdamp. If fire exists at any point in the mine there may result a dangerous amount of carbon monoxide from the incomplete combustion due to the slack ventilation and scarcity of oxygen. Or the fire may start a circulation that would cause explosive mixtures of this gas or methane accumulated in other parts of the mine, to reach the fire and, becoming ignited, produce another explosion.

The fact that a fan is thrown out of commission by an explosion always increases the danger of the situation immediately following; because the period of idleness of the fan affords an opportunity for the accumulation of dangerous bodies of combustible and poisonous gases, which otherwise would have been removed as they were generated, in those portions of the mine where the circulation was not deranged too badly. Notwithstanding the risk incurred in entering the mine after an explosion has taken place, it is the duty of those in charge to do everything in their power to rescue any who may have survived the first explosion. However, action in this regard must be guided and controlled by good judgment and experience, and it is absolutely necessary to disregard sentiment at such times.

A properly equipped rescue party should be organized at once, consisting of the most experienced men among the volunteers. The best type of breathing apparatus should always be available and portable electric lamps should be used; but at least one safety lamp should be carried into the mine to ascertain the gaseous condition of the mine air.*

Conditions in the mine will determine the method of proceeding underground. If the explosion is general in a large mine, it may be possible to accomplish little in regard to rescue work, until the circulation can be restored with the aid of the fan. It would be advisable, however, to explore the workings as far as possible, note their condition, and ascertain the possible existence of fire in the mine and the probable location of men who may have survived the explosion and are still alive, so as to render them any possible aid. Where fires are found, they should be extinguished promptly.

On the return of the rescue party to the surface, the fan should be started very slowly at first, the idea being to restore the circulation in the workings explored and to avoid, as far as possible, setting up a circulation in sections that have not been explored. To accomplish this, the ventilation must be kept under control. It will now be possible to enter the mine and explore further other sections; but in no case should the circulation be restored in those sections until it can be ascertained that no fire exists in them.

It is only possible, thus, in a general way, to outline the work; but great care and good judgment must dictate what is best to be done.

BENJAMIN HARTILL.

Johnstown, Penn.

*A caged bird or mice should also form part of the equipment, to reveal the presence of dangerous quantities of carbon monoxide.

The Liquor Problem in Mining

It is candidly admitted that the miner drinks; but whether this habit has any stronger hold upon miners than upon other classes of workers may be seriously questioned. At least, miners, as a class, are entitled to this consideration. For example, select an equal number, say 500 men, from each class of workers such as glass blowers, iron workers, machinists, foundrymen, etc.; and compare the proportion of drinking men in each class, with the proportion of drinking miners. I am confident that such a comparison would not prove unfavorable to the miner.

In all industries, it is common to hear the drinking class referred to as "good workers if they would not drink." To the credit of the miners, I will say that, in my opinion, 75 per cent. of them are honest workers, and the remaining 25 per cent. are mostly honest workers when they are sober. The same can be said of a large number of our best tradesmen; they are good workers when they are sober. Only a few days ago, I heard a boss say of one of his men: "He is the best workman we have on the job, but he will not leave drink alone."

In reference to the increase or decrease of the drinking habit among miners, I would say that there is an increase, generally, in localities where miners are crowded together in a small town or camp, devoted wholly to the coal-mining industry. But, in larger communities, where miners mix with workers in other industries, it cannot be said that they drink any harder or oftener than their fellows in other callings.

While a mine superintendent cannot always employ men who are sober, he can discourage the drink habit among the men by his own example of abstinence and by refusing to hold any position open for a man who drinks habitually. I consider drinking booths, canteens, and bootlegging should be abolished from every mining camp, and more especially for the sake of the coming generation. If we can keep the boys away from the saloons when young, they will not be enslaved to the habit when they become men. The mine foreman, by his example and by the courteous treatment of his men, can do much to overcome the baneful influence of the drink habit among his employees, while a curse and a dark look, in place of a smile, will go far toward increasing the evil.

JOHN SUTTON.

West Terre Haute, Ind.

Mixed Lights in Mining

Letter No. 18—I have been deeply interested in the discussion on this subject, and regret that the question does not seem to have reached a successful climax. One of the cardinal issues, in the operation of a gaseous mine with respect to the health and safety of the employees is, in my opinion, the exclusive use of an approved type of oil-burning safety lamp or electric lamp. This seems necessary as a reasonable precaution to avoid the possible ignition of a body of explosive gas. By prohibiting the use of open lights in such mines, we eliminate one of the factors largely responsible for mining catastrophies.

It is argued by some that the operation of a mine on a mixed light basis is justifiable under certain conditions where the quantity of explosive gas generated is small or the mine makes gas only in the solid or live workings and the circulation is sufficient in quantity and velocity to carry off and render harmless the gases generated. It cannot be guaranteed, however, that the conditions on which this argument is based will continue for any length of time. There are many things of common occurrence in coal mining that impair the efficiency of the ventilation at the working face, to the extent that an apparently safe mine becomes suddenly dangerous. The failure of the ventilating fan; the accumulation of ice in the air shaft; a heavy fall of roof in the air course, by which the mine resistance is increased; a door left open or a brattice torn down; or any one of numerous other causes may, in a moment, so disarrange the ventilating system as to render the workings dangerous where mixed lights are employed.

There are, besides, numerous geological changes that are liable to occur in coal seams and that would prove a menace to the safety of a mine operating in a gaseous district. The presence of spars, faults or clay veins is frequently accompanied with a change in the gaseous condition of the mine workings. It often happens that a strong feeder of gas is liberated by the blast of an explosion, or by the miner's pick or drill, or by the undercutting of the coal, by machines. There is no way of foreseeing and providing against such occurrences, or estimating the amount of gas that may be given off from a clay vein, fault or feeder.

As an illustration of this fact, I will mention an incident that occurred in my own experience. In the mine where I was employed, a clay vein was exposed suddenly, by the undermining of the coal with a machine. The quantity of gas given off from this clay vein was such as to render highly explosive an air current of 10,000 cu.ft. per min., for 3 hr. after the vein was cut. No argument is needed to make clear the fact that an open light, at such a time, would have supplied all that was needed to cause a mining catastrophe, the magnitude of which would be measured only by the number of lives lost and the property destroyed. I am thankful to say that, at this particular mine, safety lamps were used exclusively and this fact alone averted the danger.

The chief claim of the mixed-light advocates is that a man can perform more work in less time, with an open light, than with a safety lamp, because of the fact that the open torch gives a better light and can be carried on the head, leaving the hands free for work; it can also be relit, if extinguished, with less trouble than a safety lamp. It is claimed that the miner can produce better coal and is less liable to injury himself when using an open light. While these statements may be true, in respect to men who have been accustomed to using an open light for years and were compelled, suddenly, to adopt the safety lamp, they do not apply to men long accustomed to the use of safety lamps. The latter become and are as skilled workmen as the open-light miner, and can produce as much coal in the same time.

There are certain benefits that accrue from the exclusive use of the safety lamp. Briefly stated, these are: 1. The safety lamp tends to make the miner more careful, because it is a constant reminder of possible danger. 2. The safety lamp, incidentally, brings the miner into closer contact with the mine foreman and his assistants. When the lamp is given to the miner in the morning the opportunity is afforded of notifying him of any peculiar

danger in his place. 3. Safety-lamp mines are more free from smoke and soot, as the oil burned in these lamps is, generally, a better grade than that commonly used in the open light. 4. The flame of the safety lamp being protected, there is less danger of igniting either gas, timber, explosives, or other combustible material.

The contention that a safety lamp in the hands of an ignorant workman may prove as dangerous as an open light, is too absurd to be regarded seriously. One of the well known features of a safety lamp is that it is quickly extinguished in a body of gas, unless great care is exercised by the one holding the lamp. This is an invaluable feature in respect to the use of the safety lamp by ignorant or inexperienced workmen.

The greatest drawback and the feature that most tends to make the safety lamp unpopular with mining men, however, is the difficulty experienced in relighting an extinguished lamp. At times, the workman must travel a considerable distance to a lamp-lighting station. The cause of the lamp being extinguished may be due to careless handling; but it is often caused by the neglect of the attendant in charge of the lamp station to properly fill the lamp with oil or replenish the igniter; or, perhaps, the igniting apparatus is out of order or damp, or, as has happened, has been left out entirely, by mistake. Trouble is largely overcome, at the present time, by the use of a friction plug, the sparks of which relight a lamp burning a volatile oil. This igniter seldom fails and is a great improvement over the tape or match formerly used.

The points I have mentioned demonstrate conclusively, to my mind, that the use of mixed lights in a gaseous mine is a dangerous proposition. In such mines or districts, the life and health of the men underground can only be protected by operating the mine on an exclusive safety-lamp basis. The introduction of the electric lamp at the working face is an innovation in coal mining.

FIREBOSS.

Herminie, Penn.

Star Chamber Methods

In regard to your editorial of Sept. 20, in regard to "Star Chamber Methods," I would say that, while the faults for which penalties were inflicted at the Lehigh Valley Coal Co. contest at Hazle Park were not announced on the field, there have been prepared circular letters for each competing team, and for each team present at the meet, showing just what penalties were inflicted in each event.

E. C. LEE,
Engr. Dept., Lehigh Valley Coal Co.
West Pittston, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

QUANTITY

The term "quantity," in mine ventilation, refers to the volume of air passing in an airway, estimated in cubic feet per minute. This is often spoken of as the "circulation" of the airway or mine.

How Quantity Is Estimated—As stated above, the quantity of air circulated in an airway or mine, or the "circulation," as it is called, is always estimated, in this country, in cubic feet per minute.

How Quantity is Measured—To measure the quantity, in ventilation, it is necessary (1) to measure the sectional area of the airway at the point of observation and (2) to carefully measure the average velocity of the air current at the same point. From these measurements, the volume of air passing or the circulation is calculated by means of the formula,

$$Quantity = area \times velocity$$
$$q = a v$$

Example—Calculate the circulation in an airway having a sectional area of 50 sq.ft., the average velocity of the air current being 600 ft. per min.

Solution—Substituting the given values in the formula for quantity in terms of velocity and area,

$$q = a v = 50 \times 600 = 30{,}000 \text{ cu. ft. per min.}$$

Quantity of Air Required—In determining the required circulation of a mine, it is necessary to consider (1) the requirements of the mining law of the state in which the mine is located and (2) the requirements of the mine as determined by the natural conditions existing in the seam and the enfolding strata.

Requirements of the Mining Law—These vary somewhat in different states. Owing to the numerous and changing conditions, in mines, mining laws are of necessity arbitrary standards, which must, however, be met, except in cases where the law specially confers discretionary powers upon the mine inspector or the mine foreman, thereby authorizing them to decrease the circulation in any mine or section of the mine, as conditions may require or their judgment dictate.

The mining law commonly specifies from 100 to 150 cu.ft. per man, per min. for nongaseous, and 200 cu.ft. per min. for gaseous mines. In addition, some of the laws require from 500 to 600 cu.ft. per min., for each animal employed underground.

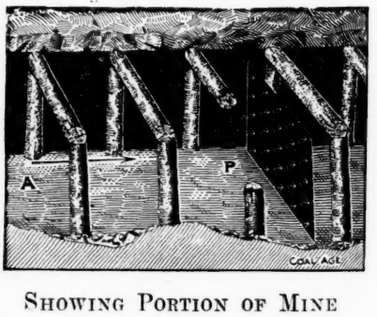
Natural Requirements—Gaseous mines naturally require more air than nongaseous mines. The rise workings of seams generating marsh gas or the dip workings of mines giving off quantities of blackdamp are often difficult to ventilate and require a circulation greater than what the law specifies, in order to keep the workings free from gas and healthful and safe for work. Slips and faults often give off much gas when least expected and require, therefore, a larger circulation of air than would otherwise be necessary in the same mine.

The Coal Age Pocket Book

WORK—POWER

The terms "work" and "power," as used in mine ventilation, are synonomous, because the work performed in moving the air through the mine airways is based on a unit of time, both the velocity and the quantity being rated per minute of time.

Power on the Air—The air current in an airway or mine is moved by a pressure called the "ventilating pressure." The ventilating pressure or the pressure producing the circulation is the total pressure (pa) exerted on the entire sectional area of the airway, as illustrated in the accompanying figure. The small arrowheads represent the unit pressure or the pressure (p) on each square foot of cross-section. The large arrow shown at A represents the total pressure P = pa.



SHOWING PORTION OF MINE ENTRY AND CROSS-SECTION

It is a law of mechanics that when a force (pa) moves or is exerted through a distance (v) the work performed is equal to the product (p a v) of the force and the distance. But in this case, the force (pa) moves through the distance (v) in one minute. The work (pav) is, therfore, performed in one minute and is the "power on the air." The work performed per minute or the power on the air is expressed in foot-pounds per minute. Calling this work per minute or power on the air u, the formula for power is

$$Power = unit\ pres. \times area \times vel.$$
$$u = p a v$$

Again, since q = av, the formula for power on the air may be written

$$Power = quantity \times unit\ pres.$$
$$u = q p$$

The formula for horsepower of the circulation is, therefore, since 1 hp. = 33,000 ft.-lb. per min.

$$H = \frac{q p}{33{,}000}$$

The power formulas, in ventilation, make it possible to calculate the power required to produce any given circulation, against any given pressure or water gage when the efficiency of the ventilator is known or assumed.

INQUIRIES OF GENERAL INTEREST

Unit Weight of Air

Will you kindly answer, through the columns of COAL AGE, the following question: What is the weight of 1 cu.ft. of air, at a temperature of —460° F., and a pressure corresponding to 1 in. of mercury?

I. C. PARFITT.

Jerome, Penn.

The temperature given, namely, 460 deg. below zero (—460° F.) is the absolute temperature of the Fahrenheit scale. At this temperature and an atmospheric pressure corresponding to 1 in. of mercury column, a cubic foot of dry air has been calculated, from numerous careful determinations, to weigh 1.3273 lb. This is the constant used in the formula:

$$w = \frac{1.3273 \times B}{460 + t}$$

which gives the weight of a cubic foot of dry air, at any temperature (t) and pressure (B), since the weight per cubic foot varies directly as the pressure and inversely as the absolute temperature.

For example, the weight of 1 cu.ft. of dry air at 60 deg. F. and a barometric pressure of 30 in., is

$$w = \frac{1.3273 \times 30}{460 + 60} = 0.0766 \text{ lb., } nearly$$

Gasoline Mine Locomotives

Kindly state whether the gasoline locomotive is considered safe for hauling coal in a mine.

J. J. HOPKINS.

California, Penn.

Opinions vary in regard to the question of safety, in respect to installing a gasoline locomotive in a coal mine, particularly a gaseous mine. There is, naturally, a strong objection, we may not say prejudice, to permitting so large a quantity of such an explosive liquid as gasoline, to be taken into the mine. For the purpose of haulage, the gasoline is handled in sealed tanks, which are taken into the mines and installed under heavy covers near the center of the machine, to guard against possible accidents due to the breaking of the tanks in the event of collision and the igniting of the gasoline.

It is claimed that with reasonable care the gasoline mine locomotive, as now built, is safer than the electric locomotive used for the same purpose, in mines. It cannot be denied, however, that the presence of gasoline, in the quantities required for mine haulage, is and must necessarily be regarded as a menace to the safe working of the mine. The majority of mine accidents are due to carelessness or neglect; and, to avoid disaster from these sources, all explosive material should be kept out of the mine, as far as possible. Many mines, however, are operating gasoline locomotives successfully, and it may be said that few serious accidents have resulted.

In this connection, another danger aside from that of fire and explosion, must be considered. When a gasoline motor is not working properly, the combustion in the cylinder is incomplete, and the exhaust gases then contain appreciable amounts of carbon monoxide. In the normal working of the engine, the exhaust gases consist chiefly of nitrogen and carbon dioxide, with water vapor. The possibility of poisonous gases in the exhaust, though comparatively slight, may result in fatal consequences under the varied conditions in coal mining. In well ventilated workings there is little danger to be anticipated from the exhaust of the engine; but the poisonous effect of the gases should be thoroughly understood by all concerned in the operation of this class of motors. When the engine is working properly, there is little smoke or odor noticeable in the exhaust; and when these are observable, they indicate incomplete combustion in the cylinder, which should be remedied in order to avoid danger and obtain the highest efficiency of the machine.

Safety in Mining

Will you kindly state what, in your opinion, are the most essential elements relating to the safe operation of coal mines. There has been so much spoken and written, in recent years, in regard to means and methods, the adoption of which it is claimed would reduce danger and make the mine more immune from accidents, that the practical man is very much confused as to what methods will produce the greatest degree of safety.

The importance of humidifying the mine air by the introduction of steam into the intake airway of the mine, has received special attention and seems reasonable, both as a means of laying the dust on the roadways, and decreasing the capacity of the air traveling through the mine, to absorb moisture and dry out the workings. It has been suggested that the danger of blasting coal in mines is greatly lessened by reducing the air current at the time of firing, but the question is yet unsettled.

A less reasonable suggestion is that the mine air should be immunized by reducing its oxygen content, and even by introducing into the air current certain inert gases, mainly carbon dioxide. Now comes the suggestion of building light collapsible stoppings, in order to localize a possible explosion of gas or dust at the working face. Is there any wonder that the layman is practically at sea in regard to most of these matters?

MINE SUPERINTENDENT.

Pottsville, Penn.

We are glad to receive this inquiry as it reveals the uncertainty that prevails in the minds of a large number of practical mine superintendents and foremen who are desirous of adopting any measures that will make the mine more safe. While no definite answer can be given to this inquiry in detail, we are glad to state that much light has been thrown on many of these questions by the discussions in COAL AGE, giving the views of practical men on these subjects. The question of collapsible stoppings is now being discussed.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What precautions should be taken in the use of safety lamps in mines?

Ans.—All safety lamps used in the mine should be of an approved type and, as nearly as practicable, of the same kind, except those used by the firebosses, who should own and care for their own lamps. The miners' lamps should all be owned by the company and in their charge. They should be examined, cleaned, filled and trimmed in a properly equipped lamp room or station, by competent men, after each shift. Preferably, each lamp should be stamped with a number corresponding to a check to be given to the man using that lamp. As far as practicable, each miner should have the same lamp given him, from day to day, and should be held reasonably responsible for its condition. The lamps should be given out in exchange for the proper check, previous to each shift, and the check should be immediately hung where it can be seen, on the hook or in the place previously occupied by the lamp. At the end of each shift, every miner returns his lamp and receives again his check for the same. The hooks, or pigeonholes, for the lamp should all be numbered to correspond to the number on the lamp.

On receiving his lamp in the morning, each miner should carefully examine the same before leaving the lamp room, to ascertain for himself that it is properly put together and in good condition, trimmed and filled. In the mine, the lamp should be carried in an upright position, at the side or in front of the person, to protect it from a strong draft; it should not be swung or tilted to one side so that the flame inclines toward the gauze or the glass of the lamp. The wick may be cleaned by the pricker when necessary to improve the light, but care must be taken not to raise the wick too high so that the flame will smoke. The lamp must not be exposed to too strong a draft and should be protected, as far as possible, from the concussion of the air caused by a heavy shot. While at work, the miner must put the lamp where it will not be in danger of falling, or being knocked over, or injured by a blow or fall of slate or coal. The miner must observe the lamp continually, at brief intervals during the day. It should not be hung too high in the roof, and, in testing for gas, must not be exposed to the gas longer than to detect the presence of the same.

Ques.—If when making an examination of the mine you found a large body of explosive gas, state what precautions you would take to prevent an accident.

Ans.—If the gas is discovered in the early morning examination, that section of the mine should be fenced off, and no one permitted to enter until the gas has been removed and the workings examined and reported safe. It may be necessary, under certain conditions depending on the arrangement of the ventilating system and the quantity of air in circulation throughout the mine, to adopt the wise precaution of undertaking the removal of the gas before anyone is permitted to enter the mine except those necessary to perform the work. There is always danger in the presence of a large body of firedamp in any section of a mine, however well isolated that section may be from the other workings. The danger lies in the possibility of a heavy roof fall or other unforeseen occurrence driving the gas back into adjoining sections. This could occur, to a dangerous extent, as the result of a slight derangement of the ventilating system, or a heavy fall of roof; and, in case of a serious accident resulting, the mine management would be responsible for not having taken every possible precaution.

In the removal of the gas, only competent men should be employed, and safety lamps should be used exclusively. All entrances to the mine or the affected section should be carefully guarded. The work should be approached from the intake side, and should be conducted with the utmost caution, time being given for the complete removal of the gas from a place, before advancing further. The progress of the work should be carefully watched by making frequent tests for gas with the safety lamp.

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine before conducting it to the face of the workings, and if not, why not?

Ans.—The intake air current in a mine should be conducted as directly as possible to the face of the heading or the inby end of the workings and returned along the working face. The air current should never be conducted through abandoned workings before sweeping the working face, for the reason that there is always more or less gas given off and accumulating in these waste places, and, as a result, the air would be contaminated to a dangerous extent. As far as practicable, all abandoned places that are not sealed off should be ventilated by a separate air current, which should then pass directly into the main-return airway and thence out of the mine.

Ques.—A mixture of marsh gas and air at its most explosive point is passing through an airway 4x5 ft. in section. The average velocity of the current is 100 ft. per min. What quantity of fresh air must be added to this current so that it will not be possible to detect gas on the safety lamp, assuming a cap cannot be detected when the gas content in the air is 2 per cent. or less?

Ans.—The area of the cross-section of this airway is $4 \times 5 = 20$ sq.ft. The volume of air in circulation is $20 \times 100 = 2000$ cu.ft. per min. Firedamp at its most explosive point contains 9.46 per cent. of marsh gas. The volume of gas in this air current is, therefore, $2000 \times 0.0946 = 189.2$ cu.ft. per min.

Now, assuming that this quantity of gas is 2 per cent. of the entire mixture after the fresh air is added, the volume of the current would be $189.2 \div 0.02 = 9460$ cu.ft. per min. Subtracting from this total volume of air and gas, the original volume, gives, for the fresh air added, $9460 - 2000 = 7460$ cu.ft. per min.

COAL AND COKE NEWS

Washington, D. C.

President Wilson signed the new tariff bill on Friday, Oct. 3. There were no changes of importance in the rate schedules of the free list, subsequent to the report of the conference committee on Sept. 30. Attention is now being concentrated upon the income tax sections of the law and upon its administrative features. In particular the working of the income tax seems to be the subject of strong interest on the part both of individuals and corporations.

The following summary gives those portions of the income tax law which have a direct and important bearing upon the payment of the tax by those who own mining shares or who are operating mining corporations and are obliged to make tax returns for the same. Some important changes were made by the conference committee in this phase of the law at the last moment, embodying provisions that had not previously become known. The income tax section itself is an extremely lengthy document but the following summary gives practically all of those portions, scattered here and there throughout the section which are germane to the subject.

The provision as to allowances for depreciation in the value of mines in making report of net individual income for taxation is interesting and follows the Senate amendment to the income tax sections. After it has provided for the so-called "normal tax" on ordinary incomes the tariff bill allows certain offsets among which is included the allowance for mine depreciation, in part as follows:

That is computing net income for the purpose of the normal tax there shall be allowed as deductions: First, the necessary expenses actually paid in carrying on any business, not including personal, living, or family expenses; second all interest paid within the year by a taxable person on indebtedness; third, all national, state, county, school, and municipal taxes paid within the year, not including those assessed against local benefits; fourth, losses actually sustained during the year, incurred in trade or arising from fires, storms, or shipwreck, and not compensated for by insurance or otherwise; fifth, debts due to the taxpayer actually ascertained to be worthless and charged off within the year; sixth, a reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business, not to exceed, in the case of mines, 5 per centum of the gross value at the mine of the output for the year for which the computation is made; but no deduction shall be made for any amount of expense of restoring property or making good the exhaustion thereof for which an allowance is or has been made: Provided, That no deduction shall be allowed for any amount paid out for new buildings, permanent improvements, or betterments, made to increase the value of any property or estate.

Subsection G. of the income tax provision is practically a re-enactment of the corporation tax now in force. The Conference Committee, however, made important alterations in its terms, leaving it to read in part in the following form:

G. (a) That the normal tax hereinbefore imposed upon individuals likewise shall be levied, assessed, and paid annually upon the entire net income arising or accruing from all sources during the preceding calendar year to every corporation, joint-stock company or association, and every insurance company, organized in the United States, no matter how created or organized, but not including partnerships; but if organized, authorized, or existing under the laws of any foreign country, then upon the amount of net income arising or accruing by it from business transacted and capital invested within the United States during such year.

(b) Such net income shall be ascertained by deducting from the gross amount of the income of such corporation, joint-stock company or association, or insurance company, received within the year from all sources, (first) all the ordinary and necessary expenses paid within the year in the maintenance and operation of its business and properties, including rentals or other payments required to be made as a condition to the continued use or possession of property; (second) all losses actually sustained within the year and not compensated by insurance or otherwise, including a reasonable allowance for depreciation by use, wear and tear of property, if any; and in the case of mines a reasonable allowance for depletion of ores and all other natural deposits, not to exceed 5 per centum of the gross value at the mine of the output for the year for which the computation is made.

HARRISBURG, PENN.

Members of the Mine Cave Commission of Scranton, have been given a few more days to secure evidence on which will be based whatever action the city finally takes against the Peoples Coal Co. to stop destruction of private and public property through the taking out of coal under the city.

After this evidence is gathered, it will then be decided just what the nature of the action to be brought against the company will be.

Two courses of action are open. The first one is a criminal action against the company under the provisions of the "Davis Mine Cave Bill;" passed by the recent Legislature. If the officers of the company are fined or sentenced to jail, nothing can prevent them, after having paid their fines or undergone their sentences from continuing their present methods of mining coal, which methods it is alleged are responsible for the wrecking of many buildings in the city.

The second action open to the city is to bring suit in equity asking that the coal company be restrained from mining coal under the streets. This is the action the citizens want, but it is doubtful if the city does anything more than bring suit under the provisions of the "Davis Mine Cave Act."

If the Mine Cave Commission finds, however, that the coal company is willfully destroying private property while taking out coal, it is possible the city will then make such action the basis for an equity suit.

The City cannot prevent the company from mining its own coal, but the question at issue is, whether or not the city can regulate the manner in which that mining shall be done. If it can, then the city can prescribe the power of the charge of explosive which shall be placed in a vein of coal under any street or private property.

In any event it is certain that some kind of a suit will be brought against the coal company, and that before the suit is finally settled that the constitutionality of the "Davis Mine Cave Law" will be reviewed by the highest court of Pennsylvania.

Efforts are being made to secure an agreement as to the facts in the case. If this plan is successful, both the city and the coal company will agree on a set of facts and the same will be submitted to the lower courts with oral and written arguments by each side in support of the theories which will be advanced by the respective parties to the suit. The decision of the lower court will thus be reviewed by the Supreme Court of this state.

Under this arrangement it will take at least a year and possibly longer before any decision is finally reached. In the meantime the company may or may not continue taking out the coal.

What the city is trying for is some effective action which will prevent the coal company from continuing its present methods of mining, which methods, it is charged are responsible for the destruction of property.

Suits are also being prepared against the Erie Co., and the Kearney & Brown Coal Co., by parties who allege that the coal in the pillars, under their homes after being bought and paid for has been mined by these companies, causing the surface to cave. This is the first time for suits of this nature to be brought up.

The Rescue of Toshesky

On Saturday morning, Oct. 4, at 7:30 a.m., Thomas Toshesky, a Polander, was released from his prison in the Mammoth vein, of the Continnental Colliery, of the Lehigh Valley Coal Co., situated at Centralia. The coal barrier that had held him prisoner since noon on Friday, Sept. 26, had been pierced.

For five days the imprisoned miner was without food. On Tuesday, Sept. 30, a bore hole was drilled through a pillar, after which a 2-in. pipe was inserted into the chamber where he was caught by the rush of coal, and a small quantity of liquid food was sent down. Later came a change of clothing, a blanket, and a rope which he wove into a hammock. These were forced through after greasing them well.

A remarkable spirit of coöperation was displayed by state and company officials and the miners alike. The company issued general orders immediately after the accident that no expense should be spared in the rescue. Throughout the entire coal regions of Pennsylvania there is unending warfare between the Slavs and other races from Central and Southern Europe and the English speaking miners, who are slowly being driven from the region by an influx of non-English labor. But all this race antipathy was forgotten during the present crisis in the effort to rescue a fellow workman of non-English origin.

PENNSYLVANIA

Anthracite

Locust Gap—Great improvements are being made by the Philadelphia & Reading Coal & Iron Co., at the Locust Spring colliery, at Locust Gap. Two new steam dumps have been installed and are proving a great improvement over the old means of dumping the coal into the breakers. A new four-drum Flory friction engine has been placed on the car road, to better facilitate the handling of cars when loading for market.

Pottsville—The cloudburst which flooded this section for a few hours last week furnished only temporary relief from the drought which has prevailed for several months. Another entire week without rain has reduced the water supply lower than it was a week ago, and unless there is a speedy rainfall a number of washeries will again close down. At least a score of towns in this section are short of water.

Wilkes-Barre—The important suit of the executor of Henrietta Baker, et al, against the Keystone Coal Co. and others, tried before Judge Cummings came to a sudden termination this week when the Court gave the jury binding instructions to find for the plaintiffs in the full amount of principal and interest, a total of $14,640. The suit was over the payment of a mortgage of $8000 on the property of the Keystone Coal Co. with interest from Dec. 1, 1899.

Lansford—The Lehigh Coal & Navigation Co. will not only convert the whole of Broad Mountain between Mauch Chunk and Tamaqua into a forest of useful trees to take the place of the present scrub timber, but will endeavor to reforest all its fireswept land, wherever situated.

Bituminous

Brownsville—W. Harry Brown, of Pittsburgh, the well known operator, is preparing to open a new mine near this place. Already work has been started and the plans are to open two slopes and a shaft. The plant will have a capacity of 4000 tons of coal daily. The work of erecting houses for the employees will be started at once. The opening of this mine will make the fourth mine for the Pittsburgh or River Vein of coal in Greene County. The first mine was opened at Rices Landing by the Dilworth Coal Co., now owned by Rice's Landing Coal & Coke Co. The next mine was opened by the Crucible Coal Co., and the third by the Poland Coal Co., and it is expected that the Youngstown Sheet & Tube Co. will soon start operations in this vicinity.

Hackett—An injunction suit has been filed against John Talbot, to restrain him from running water from his mine across the property of Paul Terchek. Terchek claims that the water contains large quantities of sulphur, which is ruining his property.

Brockwayville—The Toby Coal Co. is opening a new mine south of the property of the McKnight Coal Co., on the Shawmut R.R. line near Brockwayville, Penn., where it has a seam about 5 ft. thick. The mine is expected to yield 300 to 400 tons of good-quality coal daily for the next half dozen years.

Punxsutawney—Preparations are being made for opening another mine in the Toby Valley. The Toby Coal Co. has secured a considerable coal acreage out of town near the Pendleton place with the intention of opening it as soon as the Black Diamond Colliery becomes worked out. It is the intention to put in an uptodate plant that will accommodate a large tonnage.

Myersdale—The Huff Coal Co. is pushing two headings into the 7-ft. coal seam that was struck while prospecting last summer. The mine will have a capacity of 1000 tons per day.

WEST VIRGINIA

Charleston—A statement recently made to the effect that plans for purchasing the greater portion of the New River coal field had fallen through has met with emphatic denial. It is stated upon good authority that an American representative has sailed to confer with English capitalists, and it is expected that the deal will be put through in a short time.

Much complaint is being aroused over the car distribution system on the Coal & Coke R.R. It is claimed that the interests of the independent operator are sacrificed for those mines which are connected financially with the road.

War—The Pocahontas Domestic Coal Co. has recently installed an inclined plane to handle its output from a new opening directly to the tipple. This will materially shorten the haulage and increase the output. The company is also installing an electric power house principally for haulage purposes. This with the assistance of a four-ton gasoline locomotive already in operation puts the company in good shape to greatly increase the output of the mine.

Yukon—The Dryfork Colliery Co. is installing an electric plant for the purpose of mine haulage. Power will be supplied by the Appalachian Power Co. to a motor-generator set which delivers direct current to the mine at a voltage of 250.

Lex—The Lex Pocahontas Coal Co., recently organized at Lex, West Virginia, with J. H. Hamon, president; R. F. Taylor, general manager, and C. A. Reynolds, secretary, has completed a coal tipple and will soon be in readiness for shipping fuel.

OHIO

Nelsonville—Randall Cable, a mine operator of Nelsonville, filed a petition in the United States Bankruptcy Court with assets of seven dollars and liabilities of $1505.83.

Columbus—Operators in all parts of Ohio do not fear the announced investigation of Attorney-General Hogan and the Ohio Utilities Commission on the recent advance in coal. They say that the present increased circular is brought about by the car shortage, which is growing worse. When the recent advance was made, Attorney-General Hogan immediately announced an investigation charging that the railroads were in collusion with operators in raising coal quotations. He said the railroads were trying to work up sentiment in favor of increased freight rates and possibly increased passenger rates, and that a searching inquiry would be made to see if the antitrust law was being violated. It was pointed out to him that the lack of a strong state organization of operators was the best evidence that there was no illegal combination.

KENTUCKY

Greenwood—Captain John A. Geary will shortly begin the shipment of coal from his new mining plant near Greenwood, which is in the vicinity of Whitley City, Ky. His mine will operate one of the finest seams of domestic coal in that section, and is completely equipped. About 100 men will be employed.

Louisville—Coal men throughout the state, operators and dealers alike, are much interested in the Coal Dealers' Fire Insurance Co., recently incorporated at Louisville by Earl Martin, former president of the Continental Coal Corporation, K. U. Meguire, president of the Harlan Coal Mining Co., and of the Snead-Meguire Coal Co., and others. The capital stock of the company was fixed at $100,000, but this figure will probably be increased shortly. Mr. Martin has been at work on the organization of the company for some time, having moved some time back from Chattanooga to Louisville, where the principal offices of the company are to be permanently located. The company will confine itself to insuring strictly coal risks, including the yards and equipment of coal dealers and all insurable matter around coal mines. Investigations, which have been conducted in Kentucky, Alabama, Tennessee, Indiana and Illinois, in which five states the company proposes to do business, have shown, according to President Martin, that the kind of business which the company will write can be profitably handled at rates at least one-third lower than those now charged.

INDIANA

Linton—The Little Giant mine has been reopened for the fall trade, giving employment to 300 men.

Princeton—W. H. Rainey, member of the executive committee of the Indiana miners, called out 250 men at the mine of the Princeton Coal Co. He demands the reinstatement of an employee and alleges that he called a strike because he could not get a hearing on the trouble with Mine Superintendent Weir.

Petersburg—After five months' steady pumping following the March and April floods, at a cost of $10,000, both Blackburn mines have resumed operations, giving employment to 200 men.

Terre Haute—Simeon Fermeango, treasurer of the United Mine Workers at Libertyville, was held up and robbed one night recently when leaving the lodge hall by two men. The robbers took $465 and made their escape.

ILLINOIS

Staunton—The Consolidated Coal Co.'s mine No. 7, of this place, which has been idle for the past four years, is resuming operations, and coal will be hoisted this week. The company's improvements involved an outlay of $30,000, and includes a new shaft, tipple, and washer at No. 7, and an electric plant at No. 14, which will furnish power for three mines. Mine No. 1 of the Mt. Olive & Staunton Coal Co., is also starting after six months' suspension, during which its machinery has been completely overhauled.

Belleville—The Hibbard mine south of this place, which has been idle for the past two years, is undergoing repairs, and the operators expect to have it in working order within the next 30 days.

La Salle—The shaft of the La Salle County Carbon Coal Co. that was sunk in 1856, has recently been equipped with electric motors to haul the coal. The above company is at present operating four mines near La Salle and are large producers of Illinois third-vein coal.

Dewmaine—The Madison Coal Corporation will give an exhibition of fire fighting above and below ground, mine-rescue and first-aid work on Tuesday, Oct. 14, at their mine located at Dewmaine. The work will be done by men employed and trained by this company. This exhibition will be instructive and no doubt a success in every way.

Springfield—The Illinois Colliery Co., a $2,000,000 corporation, owning mines in Sangamon, Macoupin, Montgomery, and Bond Counties, will be sold at auction on Saturday, Nov. 15, by Master in Chancery John M. Pfeifer, to satisfy the claims of bondholders. Notice of the sale was issued recently in accordance with an order of Judge Creighton, of the Sangamon Circuit Court. Mines are located at Springfield, Chatham, Virden, Girard, Litchfield, and Sorento, Ill.

MICHIGAN

Bay City—John P. White, international president of the United Mine Workers, has given his decision relative to the trouble in Michigan, where 3000 miners were out, on account of the discharge of three of their number. He holds that the strike was not justified, as the trouble was one subject to arbitration. Mr. White had been selected as arbitrator.

IOWA

Centerville—Poor business management and deals on the Board of Trade are given as the reason for the business failure of the A. Mitchell & Son Coal Co. The assets are given as $26,000, and the liabilities are $36,000.

MISSOURI

Kansas City—The strike situation in Colorado has resulted in a movement of miners eastward, and operators of Missouri, Kansas and Arkansas are now well provided for in the way of help. Full production for the winter is assured by the addition of the strikers. Miners in Colorado demand recognition of the union by operators. This has been refused and probabilities are for a long-drawn disagreement. Most of the mines in Kansas and Missouri are manned by union labor exclusively, and the Colorado miners are seeking this section as a haven of refuge during the storm in the West.

ARKANSAS

Spadra—Lighting struck the top works at the Duck's Nest Mine and destroyed property valued at $75,000.

Denning—The Western Coal & Mining Co. has recently taken options on about 10,000 acres of coal land in the vicinity of Heber Springs.

OKLAHOMA

McCurtain—The mines of the Sans Bois Coal Co., at McCurtain, which have been closed since the disastrous explosion a year ago last March, in which nearly one hundred miners perished, have resumed operations. They will employ about 600 men.

COLORADO

Fruita—Fruita people intend to take advantage of a recent act of Congress permitting municipalities to acquire government coal lands. It is probable that a municipally operated mine will supply the demand if the necessary title or lease can be secured from the Department of the Interior. This matter will be taken up through the proper officials, and Congressman Taylor will be asked to assist in starting the municipal mines.

Crested Butte—The Crested Butte Anthracite Mining Co. has acquired and will operate the old Smith anthracite mine located about four miles northwest of Crested Butte up Slate Creek on Smith hill. This mine has been idle for about six years.

FOREIGN NEWS

Hamilton, Ontario—The Hamilton By-Product Coke Ovens, Ltd., in which American capital is largely interested, is being organized with an authorized capitalization of $1,000,000 to manufacture coke for smelting, foundry and domestic purposes. The contemplated investment is considerably larger than the nominal capital. A site of 33 acres has been secured in Hamilton.

The first unit will consist of 50 ovens each of 16 tons capacity operating on 18-hr. time, and three rows of byproduct apparatus for gas separation; also coal-preparing plant, steam and electric compressing and water-pumping plants, and other adjuncts. The initial cost will be about $1,000,000. There will also be erected a 5,000,000-cu.ft. gas holder at an additional cost of $250,000 and later on another of 3,000,000 cu.ft. capacity. The plant will carbonize 1000 tons of coal per day and will require a high-grade coking fuel, which will be imported from Pennsylvania or West Virginia.

From this coal it is expected there will be produced 700 tons of coke per day and also the byproducts comprising tar, ammonia sulphate and benzol. The tar will be worked up into various marketable products, while the coke will supply the requirements of the blast furnaces of the Steel Co. of Canada, and the foundry industries of Hamilton and neighboring industrial centers, which now import their fuel from the United States. The plant will be electrically equipped, and will use between 700 and 1000 hp. It will give employment to about 300 men, and the subsidiary industries will also require a large number of operatives.

PERSONALS

State Commissioner John H. Page, of Arkansas, has appointed John T. Fuller, of New York City, as state mineralogist and mining engineer.

Raymond D. Clere, of Boyd County, Ky., has been appointed by Governor McCreary an assistant state mine inspector, succeeding H. G. Van Hoose. Inspector Clere took up his duties Oct. 1.

On account of the death of President Cyrus H. Polley, of Buffalo, Harry Yates has been elected president, W. W. Campbell, vice-president, and William H. Nicol, general sales agent of the Seneca and Punxsutawney Coal Mining Companies. Other positions are left unchanged. The Falls Creek Coal Co. will still be managed with the others.

J. B. Atkinson has retired from the position of His Majesty's Inspector of Mines, and begun a practice as consulting mining engineer at 9 Kensington Terrace, Newcastle-upon-Tyne. Mr. Atkinson has had many years of broad experience both as an inspector of mines and while associated with the management of large collieries in Durham and Yorkshire.

Geo. Brymer, superintendent of the Edgewater mine of the Tennessee Coal, Iron & Railroad Co., has resigned his position on account of poor health and will take a six months' rest. His address for the present will be Gwynedd Valley, Penn. Mr. Brymer intends to return to Alabama in the future and is enthusiastic over the climate and business possibilities of that district.

CONSTRUCTION NEWS

Canton, Ill.—Work of repairing the boiler room at the Big Creek mine was begun recently. The rebuilding of the mine has been steadily going on, and indications are that before many weeks it will be possible to ship run of mine coal probably not later than Nov. 1.

Hillsboro, Ill.—The Shoal Creek Coal Co. is preparing to sink a mine on the Woodall farm, about three miles Southwest of Hillsboro. This mine has been under contemplation for the past two years, but even yet all of the arrangements have not been completed. Prospecting is, however, being carried on to determine the most suitable place to sink the shaft.

Middlesboro, Ky.—A number of Eastern capitalists, as well as several prominent coal operators in the Middlesboro district, are interested in a project to construct an electric railway system in and around Middlesboro, to serve the town and also to connect the various mines in that district. It is proposed ultimately to connect Middlesboro and Pineville if the road is successful as first constructed.

Whitley City, Ky.—Work is progressing actively on the operation which is being opened up on the Geary property. Chief Engineer E. W. Vanable, who has charge of the work, has had six crews busy for about three weeks, and recently put on a 24-hr. shift in order to make better progress. It is said that the coal is showing nicely along the river, but Mr. Vanable said recently that the company will probably operate shaft mines along the railroad instead of operating on the river.

Charleston, W. Va.—It is now almost certain that a new railroad will be constructed along Tug River on the south side, a distance of 50 miles or more between Majestic and Turkey Creek. A corps of Norfolk and Western engineers are now on the ground doing preliminary work. No information can be had as to the ultimate plans of the company, but it has been hinted that the activity of the Baltimore & Ohio in the coalfields has caused the Norfolk & Western to take the initiative in further extending its tonnage by acquiring new territory. Whether the survey means immediate building is merely a matter of conjecture.

Bluefield, W. Va.—A scheme is on foot to electrify the coalfields of eastern Kentucky, Tennessee and western Virginia along the lines of the Louisville & Nashville, Norfolk & Western, and the Carolina, Clinchfield & Ohio Ry. Stuart and James, engineers, of Bluefield, are in charge of this work, which will be one of the largest enterprises of its kind in the country, and will probably mean the establishment of at least three steam-operated central plants, located at different mines throughout the section to be traversed. Steel tower transmission lines will run a distance of about 100 miles from Dante, Va., to Jellico, Tenn., passing through the Harlan, Middlesboro, Pineville, and Jellico districts. One of the steam power plants is now under construction, while another now operating has a surplus of power for the immediate feeding of the mines in the districts which will be electrified. Power will probably be transmitted at 110,000 volts and stepped down at the centers above mentioned for local distribution.

Whitesburg, Ky.—It is reported that the Virginia Coal & Coke Co., operating extensive coal-mining plants in the Wise County, Va., coalfields, is starting an extensive plant on the headwaters of Guests' River, a few miles from Whitesburg, on the Virginia border, which will probably be the largest in Virginia. The company has already made good progress in the work, and has established a new town, to be known as Glenmore, which will be reached by the Interstate branch of the Louisville & Nashville, which has been held up at Norton, Va., owing to a right-of-way suit which is pending in the Virginia Court of Appeals.

NEW INCORPORATIONS

Cleveland, Ohio—The M. A. Hanna Dock Co. has increased its capitalization from $210,000 to $500,000.

Cleveland, Ohio—The M. A. Hanna Coal Co. has increased its capitalization from $100,000 to $200,000.

Salem, Ohio—The Deming Co., of Salem, Ohio, manufacturers of mine pumps, has filed papers with the secretary of state, increasing its capital stock from $150,000 to $250,000.

Knoxville, Tenn.—The Catrons Creek Coal Co. has filed amended articles of incorporation increasing its capital stock from $40,000 to $75000, additional capital for development work being desired by the company.

Wilmington Del.—The Pocahontas & Southwestern Coal Co., of Wilmington, Del., was recently granted a charter under the laws of Delaware, with a capital of $200,000; Harry W. Davis, Wilmington, principal incorporator.

Belleville, Ill.—Articles of incorporation for the New Freeburg Coal Co. have been filed at the office of C. A. Sommers, recorder. The capital stock is $6000, and the incorporators are L. Senior, V. M. and John Henderson.

Indianapolis, Ind.—The Linton Summit Coal Co., of Linton, has been organized with a capital stock of $45,000 for the purpose of mining. The directors are J. A. Templeton, W. J. Hamilton, Philip Penna, Davis R. Scott, and J. P. Jeffries.

Pittsburgh, Penn.—The Ozark Bauxite Co. has been organized for the production of coal, gas, and other minerals and ores. The capital stock is $25,000, of which $500 has been subscribed and $50 paid in. The incorporators are W. B. Becher, S. B. Kelly, W. H. Young, J. M. Holliday, and George I. Wolf, all of Pittsburgh.

Kaeferton, W. Va.—The Milburn Coal Co., has been organized to develop 5900 acres of coal land and has already closed a machinery contract. It will install a plant with initial capacity of 2500 tons daily to cost from $200,000 to $300,000 on the Paint Creek division about 18 miles from the main line of the Chesapeake & Ohio R.R.

Denver, Colo.—Articles of incorporation have been filed in the office of the secretary of state for the United Yampa Collieries Co. This is a four million dollar corporation formed to operate large tracts of coal lands in Routt and Moffat Counties. The incorporators are John F. Campion, Fredk. G. Moffat, and Kenneth B. Townsend. The project includes the building of a railroad, 110 miles long, to connect the Denver and Salt Lake at a point near the confluence of the Elk and Bear rivers, and the Union Pacific near Rawlins.

INDUSTRIAL NEWS

Connellsville, Penn.—The Hecla works at Pleasant Unity are turning out about 135 tons of coke per day. Fifty of the 171 new ovens have been completed.

Columbus, Ohio—Notices have been issued for the annual stockholders' meeting of the Hocking Valley Ry., which will be held in the general offices in the Spahr Building. A board of directors will be elected.

Newburg, W. Va.—The Virginia-Maryland Coal Corporation began shipping from its newly opened Scott Hill mine near here on Oct. 2. This mine is one of the most modernly equipped collieries in the state.

St. Clairsville, Ohio—Henry G. Unterzubar, of Bellaire has filed suit in the local court, claiming $15,000 damages for the loss of his arm, which was torn off when he was caught in a cable at the mines owned by the Johnson Coal Co.

Blaine, Ohio—Determining to devote its entire attention to the coal and coal mining business, the Loraine Coal & Dock Co., one of the largest operators in the Belmont County field, has sold its company store at Blaine. The general store sold for something in the neighborhood of $50,000, it is understood.

Belleville, Ill.—Suit has been brought in the circuit court by the trustees for the bondholders of the Royal Coal Mining properties here, to foreclose on the mortgages. They claim that because of financial troubles the mine has been unable to operate for several months, and that the sooner the properties are disposed of the more they will bring.

Whitesburg, Ky.—Announcement is made of the purchase by A. H. McClure, and associates of Frankfort, of the John and Henry Combs coal and timber land tract on Lower Rockhouse Creek at a price which is unusually large although it has not been made public. It is said to be the intention of purchasers to develop the property at an early date.

St. Louis, Mo.—When the Manufacturers R.R. bought the St. Louis & O'Fallon R.R., it was understood that the coal mines at the eastern terminus of the line between Belleville and O'Fallon, Ill., were not included. It has since been announced, however, that the mines also had been purchased and paid for. These produce on the average 135 cars of coal a day.

Owensboro, Ky.—John B. Brasher, representing a syndicate composed of Madisonville, Ky., and Eastern people, recently closed a deal for a coal mine and yard at Owensboro, Ky., and has taken charge of the property as general manager for the purchasers. The property is practically new and is well equipped, its location in Owensboro, a city of 20,000 inhabitants, being particularly favorable.

Springfield, Ill.—On information filed in the Circuit Court by Assistant States Attorney Bernard, a case will be established to determine the constitutionality of the law requiring coal mines, foundries, steel plants, and other factories to provide a wash house for the employees. The information has reference especially to the Cora Coal Mining Co., at Andrew. Here it is said the men are compelled to leave the mine with dust and grime upon their face and hands.

Pittsburgh, Penn.—Fatalities in the coal mines of the United States during the first seven months of the year, numbered 1437 as compared with 1419 in the same period last year, according to the reports of the Bureau of Mines. Pennsylvania leads the list with 763 deaths, an increase of 197 over last year, of these 380 were in the anthracite and 383 in the bituminous fields. West Virginia with 181 deaths shows a decrease of 72 over the fatalities in the first seven months of 1912.

Columbus, Ohio—Attorney-General Hogan has written a letter to Receiver George P. Johnson, of the Detroit, Toledo & Ironton Ry. Co. advising that if steps are not taken at once to improve the service of the road he will ask the Federal Court to annul the company's charter. The same kind of ultimatum was forwarded to the attorney for the bondholders. Of the 20 engines belonging to the road which were condemned recently by the Ohio boiler inspection department 14 have been repaired and returned to service.

COAL TRADE REVIEWS

GENERAL REVIEW

Producers continue in firm control. Market quiet but potency of the situation accentuated with the advancing season. Car supply and weather conditions the predominating influences at the moment.

The coal markets have presented little of additional interest during the past week. In the bituminous situation no uncertainties have developed, and producers continue as firmly in control as at any time during the past few months. The uniformity with which quotations are maintained in all the markets of the country speaks eloquently for the trend of conditions. Where reverses are recorded they are easily traceable to an over-shipping of specialties, principally of the lower grades, into certain restricted markets; their effect on the potency of the general situation may be neglected.

Every confidence is expressed in the outlook, while the general firmness is being accentuated almost daily by the advancing season. One of the most significant features of the situation is the enormous increase in the shipments of the principal coal roads; the September reports for a number of the more important carriers show a continuation of the substantial advance over previous records, while the gain for the year to date is so large as to cause apprehension, were it not known that the coal was going into immediate consumption.

In anthracite, it is becoming increasingly difficult to obtain shipments of nearly all sizes, companies appearing to have more orders than they can take care of for some weeks to come. Concessions by the individuals have now practically ceased altogether. Business is already being turned down, and a little cold weather is all that is necessary to precipitate an active market.

The strong undertone to bituminous continues unchanged, with producers very cautious about future commitments. The improvement is even noticeable in the lower grades. A higher price level has now been definitely established in the Pittsburgh district; contracts for the year can still be closed at the old circular, but, for deliveries up to Apr. 1 only, the new quotations are invariable demanded. Production there has also been seriously curtailed by the car shortage, which is expected to become even more serious before the close of navigation on the lakes.

The car situation in Ohio is the predominating feature in that market. The visible supply of equipment is rapidly diminishing, and production has been seriously curtailed as a result. The Lake shipping is at the maximum, while the steam business is showing good form and the domestic grades are being stimulated by the cool weather. Dumpings at Hampton Roads have fallen off because of the heavy movement to the Lakes, but business, nevertheless, still continues active.

The car shortage in the Middle West has almost reached acute proportions, while one important congestion has already been reported. As a result of the uncertainey in the movement, the market is notably stronger and is now in the most satisfactory condition for the last three years. A sharp fall in temperature is the only thing necessary to make a very active situation in the Middle Western market.

BOSTON, MASS.

Hampton Roads dispatch somewhat improved, shippers holding coal for boats due, and spot market rather light. Georges Creek shortage continues and creates a better demand for certain of the Pennsylvania grades. Dealers waiting turns for anthracite shipments, and broken and stove very hard to get.

Bituminous—Prices at Hampton Roads continue nominal, for there is practically no spot coal available. The agencies are all saving their receipts against transportation that is due to arrive. Dispatch therefore is rather better than a week ago and while this is not regarded as a sign of weakness yet there is not the demand in New England for prompt coal that was expected at this time. Some of the operators are seeking premiums of the various shippers but the latter for the most part are confining themselves to contract obligations. Indeed, it is doubtful if today any considerable tonnage could be sold at $3 f.o.b. There is a strong undertone however with still a considerable anxiety on the part of consumers who have supplies due them on contract.

Thick weather again prevails and should it continue a week or so it will probably put a different face on the distributing market here. At present the supply for inland delivery is ample and on car prices are somewhat easier than a week ago.

On Georges Creek the situation is no better than during September. The bulk of the output is going to fill requisitions from the Government and for export. The loading at Baltimore is still slow and at Philadelphia there is practically none of this grade available for coastwise shipment.

The Pennsylvania coals that can in any way be considered substitutes for Georges Creek are in better demand than for 60 days. Prices are up another five cents on the better known grades and all the shippers are going slow on futures. There is a good deal of inquiry for the Clearfields that are favorably regarded, especially for shipment in conjunction with anthracite from Philadelphia.

Anthracite—The shortage of stove is fast becoming acute. Broken, too, is increasingly hard to get, and dealers are patiently waiting their turns for shipments of any kind. The companies have all the business they can take care of for weeks to come. The recently announced advance in freight rates on anthracite company transportation from New York to points around Cape Cod and on Long Island Sound are apparently in full effect, save only in the case of one or two companies.

At retail, hard coal in Boston was advanced 25c. Oct. 2, making $7.75, $8 and $8.25 respectively the prices for egg, stove and chestnut per net ton delivered. The bituminous market is now quotable as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.10@1.60	$1.30@1.70	$1.67@1.77	
Philadelphia*	2.35@2.85	2.55@2.95	2.92@3.02	
New York*	2.65@3.15	2.85@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.90@3.00
Providence†				3.88@3.93
Boston†				3.93@3.98

*F.o.b. †On cars.

NEW YORK

Car supply the controlling feature in the bituminous situation. Business continues heavy and prices firmly held. Anthracite trade a weather proposition. A surplus of egg, but stove coal is in equally short supply.

Bituminous—A sharp restriction in the car supply has caused the local soft-coal market to experience a further and quite perceptible tightening up. There has been no change in the situation on the B. & O., which has been notably bad for several weeks, while the Pennsylvania made an unexpectedly poor showing during the last three days of last week, when the supply amounted to only about 40% requirements. The roads ascribe their trouble to the slow return of equipment from foreign lines. The outlook for the current week is not very favorable at this writing, although the roads claim they are receiving their cars back more rapidly, and there will be a moderately good supply this week. No complaints as yet have been received regarding the situation on the New York Central.

There does not seem to be much surplus coal available, and operators are occasionally being forced into the open market for tonnages to fill out their contracts. A great deal of difficulty is still being experienced with labor, miners at a number of the Pennsylvania operations now flatly refusing to work on any Saturday. The volume of spot business, locally, appears to be a little larger, particularly, in the line trade. There is not much contracting being done, and few operators show any disposition to accept anything now for delivery up to Apr. 1, preferring to keep what coal they have available unless a favorable business is offered for the year. We continue to quote the local market on the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—The hard-coal market is showing a tendency to drag, pending a change in weather conditions. Egg coal is particularly heavy and can be moved only at conces-

sions from 15@25c. per ton off the regular circular. Shipments of egg and nut are heavy. The better grade steam sizes are in moderately good demand, while the off grades are slow. Stove coal continues generally strong at all points and is still the feature of the market; indications point to a shortage of this grade all winter. With the exception of egg coal, there are little or none of the other grades going into storage.

As already noted, it is essentially a weather market from now on, although there are some who believe that there will be an active situation this winter, regardless of climatic conditions. The return of warm weather this week seems to have had a softening influence upon the local situation. However, it is believed that all the mines will be working full time from now on and, although the situation at tide is rather quiet, the line trade is showing a good healthy undertone.

We now quote the New York market as follows :

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$4.95	.....
Egg	5.25	$5.10@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.50	5.20	5.20@5.45
Chestnut	5.50	5.50	5.45	5.45
Pea	3.50	3.40@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.35@2.70
Rice	2.25	2.25@2.35	1.95@2.20	1.90@2.20
Barley	1.75	1.75	1.50	1.50@1.70

PHILADELPHIA, PENN.

Broken and stove in very short supply. Price cutting by individuals about stopped.

A little cold weather will spur the anthracite coal trade into activity in this vicinity. All the operators are working their mines full time, and claim to be disposing of every ton of their product. As a matter of fact, broken and stove coal are far behind the demand; while it is yet early in the season, there have been cases of business on the former size being turned down, owing to the inability of the operator to fill it when required. Broken coal has been in poor supply ever since the first of April, and does not seem to improve as the season grows. Reassuring reports come from the dealer as well as the operator for a good business from now on, at circular prices, as the individual operators seem to have declined making further concessions. One hears of very little cutting, and this only when there is danger of coal going on demurrage Only one large operating company in this city seems to make the Pennsylvania state tax condition insistent, refusing to depart from its policy adopted at the inception of this tax; with the demand on, it is likely to make little difference.

Retail prices for the winter are announced as follows: Broken and egg, $6.75; stove, $7; chestnut, $7.25; pea, $5.25@5.50, with 25c. per ton added if carried in. This for a ton of 2240 lb.

Slack or screenings seem to be the leader in the bituminous market at the present time, bringing about a complete change of the situation. Prices are anywhere from 25 to 30c. higher than has been quoted for a month or six weeks back, and the increase only seems to enhance the scarcity; $1@1.05 is about the maximum. The market on the other varieties, however, seems to remain unchanged, although, if anything there is a leaning to weakness rather than strength. One still hears of car shortage, both in the bituminous as well as anthracite regions, and with the advent of cold weather, this is likely to occasion trouble.

PITTSBURGH, PENN.

Regular minimum prices for prompt coal announced by operators corresponding to advanced prices recently quoted in open market. Former circular prices nominally in force for yearly contracts, but no demand. Car supply poorer, decreasing production materially at some mines. Connellsville coke market is definitely lower, all demand having been satisfied without cut prices disappearing.

Bituminous—In recent reports we have noted a growing scarcity of prompt coal at the circular prices, and last week noted the absence of any in the market except at advances of 10@20c. This situation has crystallized into definite announcements of higher minimum prices on the part of various operations. On Oct. 1 the Pittsburgh Coal Co. announced the following as its minimum figures for prompt: Mine-run, $1.40; ¾-in., $1.50; 1¼-in., $1.65. Sales have been effected at these prices without difficulty. Other operators have advanced to at least this level, while some have gone to $1.50 for mine-run, $1.60 for ¾-in. and $1.70@1.75 for 1¼-in. and claim to have made some sales.

As to contracts, many operators will contract for regular deliveries up to Apr. 1 at their prompt prices while some refuse to do so. On contracts for a year the old circular prices, based on $1.30 for mine-run, are nominally still in force, but some operators would decline to sell at them, and in general there is practically no demand for such contracts. We quote the nominal season contract market unchanged as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. domestic, $1.55, and quote the prompt and forward market as follows: Slack, $1.10@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Reports as to car supply vary. A large interest reports the supply as much worse than 30 days ago and appreciably worse than 10 days ago, to such an extent that its production is seriously curtailed, while some other operators report the supply as somewhat insufficient, but not measurably worse than 30 days ago. Shortage of labor is a factor but not nearly as serious a one as car supply in determining production. Considering the season, prospects are naturally for a further decrease in car supply during the next 30 days but after the close of lake shipments five or six weeks hence, a good supply should obtain.

Connellsville Coke—The coke market has not been strengthened as hoped by the accretions to the ranks of the "regulars" as reported a week ago. On the contrary the market is now definitely quotable on a lower basis as the October demand for furnace coke has been entirely satisfied without all the cut price coke being absorbed. During the past ten days sales for both prompt and October shipment have been made at $2.15 to $2.25, involving furnace coke of substantially standard grade, while slightly off grade coke has gone at a trifle less. There is now no demand for prompt or October, and only diletante inquiry for November and December, while no interest at all is manifested in next year's deliveries, though quotations of $2.25 could no doubt be secured.

The alignment today is that about 5000 ovens sell through the Producers Coke Co., having a minimum quotation of $2.50, and about the same number sell independently but are adhering to this minimum, while an equal number are controlled by other operators, some of whom are willing to sell at $2.25 or less, and demand is so light that these operators make the market. Unless conditions improve the "regulars" will probably recede to say $2.25 for next year, but for this year they simply stay out of the market. There is a temporary accumulation of coke loaded and awaiting shipping instructions, which points to a special restriction of operations this week by dropping a day or two at the end. We quote: Prompt furnace, $2.15@2.25; contract furnace, $2.25; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 27 at 385,494 tons, an increase of 7057 tons, and shipments at 383,366 tons, a decrease of 6376 tons.

BALTIMORE, MD.

Generally stronger tone to the market, even for lowest grades. Slack continues to show remarkable form. Export business again on the increase. Retail anthracite prices advanced.

The market here continues to be highly interesting; during the past week it showed decided evidences of strengthening. Not only did the good grade coals, already largely out of the market, hold steady at their high level, but the lower grades, that had showed signs of weakening, were in better call and at advancing prices.

Demand throughout the Northwestern territory continues excellent for West Virginia gas coals. Three-quarter in large lots was being sold at from $1.15 to $1.20 Westward, and what was released East was good for from $1.10 to $1.15, a decided improvement over the figures of a short time previous. Low grade run-of-mine was also doing much better, selling in some cases up to the $1 mark. This was from 10 to 15c. better than previous quotations.

Slack was the decided feature again; sales around $1.10 were not unusual. The demand seems to be increasing steadily and still higher figures are expected. Pennsylvania steam coals were much stronger along with the rest of the market; even ordinary grades there were selling at from $1.15 to $1.20.

Car supply was quite short again during the past week in both the Fairmont and Somerset regions. This was in distinct contrast to the previous week when an exceptionally heavy tonnage was handled. Port business is again improving. A large number of foreign charters have been announced for the coming month's loadings.

Interest was injected into the local anthracite situation by a meeting of the Baltimore Retail Coal Exchange when it was decide to add 25c. per ton to the regular winter schedule. This is to cover the 2½% Pennsylvania, state tax which is being tacked on to most bills to local coal men, and the regular increased cost of winter deliveries.

BUFFALO, N. Y.

Production up to the full limit of the car supply. Heavy shipments of Allegheny Valley coal to the Lakes. The outlook when Lake shipping closes. Anthracite picking up rapidly.

Bituminous—The coal production is now up to the full limit of the car supply. Operators generally report that their outputs are entirely covered for several weeks to come and that they are obliged to go into the open market for any coal required on their side trade. The Pittsburgh district product is almost unobtainable except where one has direct connection with a mine, and Allegheny Valley grades are almost in the same condition. Lake shipments from the latter district have never before been very heavy, but mines which formerly shipped but little in this trade are now sending their entire outputs there, superseding the Pittsburgh coal which formerly controlled this business almost exclusively.

The heavy shipping in the Lake trade has created the opinion among some, that when this closes, Dec. 1, there will be a sharp slump in the market. It must be remembered in this connection, however, that consumption will be heavily increased by that time, due to the advancing season, while, on the other hand, the movement will be materially restricted by the inevitable car shortage. While the roads are now handling the situation in fairly good form, this is mostly due to the short haul to the Lake shipping ports; when the general demand opens up all over the country, the haul will be much longer, the movement more complicated and the equipment more scattered. Bituminous is already being loaded in box-cars, coke racks, or anything that can be obtained.

The scarcity of money among the Canadian consumers is being commented on a great deal in the local trade; it seems to be a question as to whether they will be able to meet their obligations when the returns from the crops come in. However, money is not easy locally, either, although there is no general complaint about collections as yet.

Buyers are not alarmed over the outlook, however, for, as a rule, they are well covered by contracts on which they are demanding full shipments. Generally speaking, good prices were obtained on this business, but not nearly so much as might have been in the prompt market at the present time. Quotations are quite as strong as ever at $2.90 for Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run and $2.25 for slack, with Allegheny Valley about 20c. lower, except slack, which often sells on a par with Pittsburgh.

Coke—While there appears to be a heavy consumption of this product, consumers seem to be in control of the situation, and the market is weak. Reports are heard that ovens are to be blown out but there is always still plenty of the coke to meet the demand. Local quotations remain at $4.85 for best Connellsville foundry.

Anthracite—The demand is improving slowly but steadily. A great deal of uncertainty is still evident regarding the new Pennsylvania state tax, and it is the general opinion that it will be declared invalid by the courts. Stove is in such heavy demand, that producers are already obliged to force the buyers to take a certain percentage of egg with all orders. The shipper or jobber not infrequently adds the 25c. per ton to stove.

Anthracite shipments by lake were 532,115 tons for September, which is less than the corresponding month of last season for the first time. For the season to October the amount is 3,840,536 tons, as against 2,482,353 tons to the same date last season. With two full months yet this season the shipments are about 115,000 tons ahead of last season. Shipping agents say that they could handle considerable more coal than they are getting and they are eager to keep up their tonnage.

COLUMBUS, OHIO

Increasing car shortage is restricting production seriously. The situation is steadily becoming worse and as a result prices are strong. The demand for all grades is good. Lake trade continues active.

The feature of the coal trade in Ohio during the past week has been the increasing car shortage which is curtailing production to a large extent. This, together with the good demand has maintained quotations firmly; in fact the tendency is upward and there is very little cutting of prices. On the other hand some premiums are being offered for spot shipments. It is believed that the car shortage will grow worse soon and dealers are preparing to increase stocks if possible.

The strongest point in the market is the demand for the domestic grades. Retailers are placing orders for immediate shipment and their business is growing better as the winter approaches; every effort is being made to guard against a shortage of stocks when the first cold spell arrives. Deliveries to customers are being made now and most of the large householders have laid in their winters supply of fuel. Retail prices are advancing and are now the highest in two years. The Toledo docks of the Hocking Valley Railroad have handled 2,300,000 tons since the opening of navigation.

The steam trade is also rather strong for the season of the year. Manufacturing is active, especially in iron and steel and other metal lines. Requisitions for fuel are holding up well and in some cases are being increased. Coupled with that demand is the good freight movement on railroads which requires a larger fuel tonnage. Contracts are being carried out but renewals are being made at higher figures than prevailed last season.

Car shortage has curtailed production. This is especially true of Eastern Ohio and the Pomeroy Bend district where the shortage of cars has been the most pronounced. It is estimated that those districts only produced 55% of normal during the week. In the strictly domestic fields of Massillon and Cambridge the production was also smaller; in the Hocking Valley the output is estimated at 65%.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75@1.70	.....	$2.00@1.90	$1.75@1.70
3-4 inch	1.60@1.55	$1.50@1.40	1.75@1.65	1.55@1.50
Nut	1.30@1.20	.....	1.60@1.55	1.25@1.20
Mine-run	1.40@1.30	1.25@1.20	1.50@1.40	1.25@1.20
Nut, pea and slack	0.85@0.80	.....	1.00@0.90	0.75@0.70
Coarse slack	0.75@0.70	0.95@0.90	0.90@0.80	0.65@0.60

TOLEDO, OHIO

Steam business shows good form while Lake shipping continues up to the maximum for the season. Car shortage affecting the situation. Cool weather stimulating the domestic demand.

The shortage in cars has been more marked during the past week than at any time thus far and the effect on the local trade was quite noticeable. Lake business continues heavy although shippers are complaining bitterly of lack of tonnage from the mines which, of course, makes it difficult to take care of cargoes. Steam coal is in splendid demand and the fine grades continue to strengthen both in demand and in price; coal men here generally predict an increase in prices due largely to the difficulty in securing cars and to the labor trouble at the mines. Domestic coal increased materially in demand after the cool weather of last week and the market is in fine shape.

Toledo's shipments both in coal and coke show remarkable increases over other seasons and with the completion of the large new concrete dock of the Hocking Valley next year the business will be still larger. Prices here remain unchanged.

LOUISVILLE, KY.

A sharp advance in steam grades the feature of the market. Domestic demand continues strong and cars are in excellent supply, considering the abnormal activity. Considerable trouble experienced with the new hopper-bottom equipment.

A gratifying change is noted in the local market by a pronounced tightening up of the steam grades. The demand seems to be no better than it has been, for there is little room for improvement in this respect. The previous weakness was due to a heavy oversupply of screening, but this has ceased to exist now, with the result indicated. A petition of the operators to the Illinois Central R.R., requesting the company to switch their orders from mixed coal to straight mine-run, which the road agreed to do, is one of the principal causes for the changed condition. The almost violent fluctuation of the steam market has been the cause of a great deal of anxiety, and the operators are much relievd at the improved condition. No change is perceptible in general industrial conditions, except possibly, the demand is showing further increases and indications point to a higher price level shortly.

The domestic sizes remain in as heavy demand as ever, with the market strong on all grades. The better qualities of block from eastern Kentucky are selling at $2@2.25, f.o.b. mines, with occasional sales of fancy specialties at as high as $2.40. Nut and slack are now steady at 75@85c. for the better grades, with the second qualities quotable at about 50@60c. The car supply is unusually good, considering the heavy movement. The threatened labor trouble also failed to materialize, due, it is believed, to the weakened financial condition of the miners as a result of their long struggle in West Virginia.

The only troublesome feature in the situation at the present time is the large hopper cars of the Louisville & Nashville R.R., reference to which has been made in these columns. Eastern Kentucky operators feel that they are being discriminated against in this respect by an allotment of a

larger percentage of the "battleship" cars, and are protesting vigorously. Producers having low tipples, which can only load the smallest cars, are being favored in this respect, but the railroad is assuming an arbitrary position in the matter with the newer operation, while on all new development it is insisting upon the tipple being designed to load the new equipment. In addition to the difficulties encountered in loading at the mines, there is also the further trouble and greater expense of unloading where trestles are not available. However, the new cars have come to stay, and the coal industry would do well to adapt themselves to the new conditions.

HAMPTON ROADS, VA.

Shipments for the week only fair. Government calling for coal to bunker fleet for its European cruise. Hampton Roads dumpings for September fell below August figures, although Virginian Ry. makes a record month.

Shipments from Hampton Roads during the week have only been about fair, the movement not being so heavy either foreign or Coastwise. There is perhaps a little more than the normal supply of coal at tidewater but this is probably due to the fact that a number of the government suppliers are accumulating coal to take care of colliers which will be loading during the next few days. The Atlantic fleet is now in the Roads coaling from steamers and barges and as soon as it is supplied the colliers will be reloaded and accompany the fleet on its European cruise.

Buyers inland are still anxious for coal and prices are therefore remaining firm with indications that they will continue so for some time. Sales of small tonnages of high volatile coal were made during the week at from $2.60 to $2.75. Pocahontas and New River quotations have been from $2.90 to $3 with little selling of at either price, there being very small quantity of free coal.

A total of 988,465 tons of coal were dumped over the Hampton Roads piers, during the month of September just ended. This is a falling off of about 41,000 tons below the August figures. The decrease occurred with the Norfolk & Western and the Chesapeake & Ohio, the Virginian Ry. showing an increase of over 17,000 tons above their record month. This road alone dumped 300,588 tons, over one pier; the C. & O. Ry. at Newport News dumped 256,934 and the N. & W. from Lamberts Point 430,943 tons. The decrease in dumpings over the N. & W. and C. & O. is probably due to the fact that these two roads move large quantities to the Lake at this particular season while the Virginian's shipments west are not so heavy.

DETROIT, MICH.

Possibility of a car shortage having a steadying influence on the situation. Transportation problem a trifle clearer at the moment. Steam grades strong and anthracite active.

Bituminous—There has been a very heavy movement into Detroit during the past week, several hundred cars having been distributed to operators and manufacturers. This would seem to indicate that the railroads are in an excellent position to take care of the heavy fall business, and that the production will not be seriously restricted. The situation is much improved over a few weeks ago, when it looked for a time as though it might become acute. The railroads are cleaning up their yards of any track coal, and are in a better condition than they have been for some time. The cold weather of the past week has had a moderately stimulating effect upon the trade.

The market is now quotable on approximately the following basis.

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.50	....	....	$2.75	$2.50
Egg.....	1.65	....	1.50	....	....	2.75	2.20
Steam lump....	1.45	....	1.10	....	....	....	....
2-in. lump.....	1.25	$1.25	1.25	1.25	1.25	....	....
Mine-run.....	1.15	1.15	1.15	1.15	1.15	1.60	....
Slack.....	0.90	0.90	0.70	0.85	0.85	....	....

Anthracite—The recent cold snap stimulated the local market to such an extent that shippers are falling behind on their requirements. The shortage has been so pronounced that shipments have been made in gondola cars instead of the usual box-cars. Stove coal is in the greatest demand, the situation being almost acute; dealers are insisting upon a certain percentage of egg being taken with any orders for stove.

BIRMINGHAM, ALA.

Steam coal rather quiet. Lump coal fair. Smithing about normal for this season of the year. Car supply shows some improvement. Pig iron for balance of year selling at $12.

The principle operators report that business on steam coal for the past week has been rather quiet. There is a large accumulation on the tracks and in storage bins, and some of the large consumers have asked that their shipments be held up for the time being. This is due to the fact that the production has exceeded the demand recently, but with the oil mill business starting soon, it will relieve this condition.

The demand for lump coal is fair, but it will take a few days of good cool weather to make any marked improvement. The higher grade coals advanced 25c. per ton on Oct. 1, and the lower grades 10c. per ton. This is following the regular schedule, and operators are not inclined to make any reductions from the circular prices in order to obtain business.

Smithing coal shows some improvement. Foundry coke is about the same as last week, as is also furnace coke. Foundry is steady at $4 to $4.25 and furnace $2.75 to $3.25.

The car supply on most of the lines shows some improvement, with the exception of the Southern Railway. A few mines on the L. & N. report having to close down for two days last week because of the lack of cars, while those on the Southern, state that it seems to be almost a matter of impossibility to secure sufficient cars to keep going at half-time.

The market on pig iron is firm at $12 for the balance of this year, with fairly good sales at that figure, while bookings for the first quarter and half of 1914 are 25 to 50c. in advance of that figure.

This district is not expected to suffer to any extent due by the tariff on pig iron, all coal operators and iron producers looking for a banner year both in tonnage and prices.

INDIANAPOLIS

The car shortage is making itself felt and shipments are badly delayed. Congestion due to natural causes and may soon be relieved. Prices hold firm, the tendency being upward. Steam coals improved and the movemnt of domestic grades fully up to normal for the season.

The pinch of the car shortage is felt more in the coal industry. There are delays in the transportation of both Indiana and Eastern bituminous coals. A complaint from a Muncie manufacturing company was called to the attention of the Public Service Commission of Indiana and an investigation showed a coal blockade on the Big Four road both at Indianapolis and Terre Haute. The coal operators have also complained and ask for relief. The railroad company says the short cold spell in September resulted in such a demand that the road was swamped and did not have adequate motive power. It has promised the commission to give special attention to the coal traffic until the congestion is relievd. The roads in Ohio and Indiana have not fully recovered from the flood devastation of March and April and they are using many of their cars for gravel hauling.

Prices at the mines hold firm, the car situation having a tendency to cause higher bids from those who need coal. Some companies say they are having inquiries from buyers they never had on their books, showing that these are not able to get supplies through their regular channels. Mines are practically on full schedule, stopping only when cars are not to be had. The retail trade continues fully satisfactory. Screenings are moving better, showing a gradual improvement in industrial conditions and steam coals generally are in better demand than had been expected. The general feeling in the trade is optimistic.

CHICAGO

A sharp upturn in practically all branches of the local market. An advance ranging from 5 to 15c. a ton in the price for screenings. Larger sales of furnace, foundry and domestic coke. The car supply, as a rule, has been satisfactory.

According to operators and dealers, the Chicago coal market is in a more satisfactory condition than it has been at any time during the past three years. There has been a boom in the anthracite business and reports from various quarters indicate exceptionally heavy sales. This is accounted for in part by the fact that buying was delayed by many dealers who ordinarily send in substantial orders during August.

A decided improvement has been noted in the market for screenings. Prices for the lower grades have advanced 5c. a ton and the better grades are selling at an increase of from 10 to 15c. a ton. The demand for furnace, foundry and domestic coke is strong, a number of exceptionally large sales being reported; prices continue to be firm. Franklin County operators report a heavy trade. Two of the largest firms in that field have advanced the price for lump, egg and No. 1 nut to $2.25 and others are expected to follow. Carterville operators are quoting $2 for lump, egg and No. 1 washed coal, while No. 1 raw nut and No. 2 washed are selling at $1.60 to $1.75 a ton. Prices for Indiana coals remain firm.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.97	2.30	1.87	3.45@3.55
Screenings	1.27@1.32	1.75@1.80	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.35; gas house, $4.65@4.75.

ST. LOUIS, MO.

The coal market did not advance as was anticipated the first of the month. It continued strong but showed a tendency to weaken. Indications this week are that it will hold up and with a drop in the temperature, prices will likely see an advance.

Franklin County lump and egg is strong at from $2 to $2.15; this quotation is made, however, because the mines are sold up. Carterville is down to about $1.80 to $2. On account of the O'Gara operations being shut down for the past few weeks, the screenings market on high-grade coals has been wonderfully active. When these mines resume, screenings will likely tumble again.

The C. & E. I., Iron Mountain, and Illinois Central, are giving their mines about three days car supply a week. The Wabash is in a deplorable state on account of its bad order equipment. The B. & O., L. & N. and Southern seem to be taking pretty good care of their mines, but the Pennsylvania appears to have the most equipment at this time. Standard coals are still being sold at about the cost of production and there seems to be no hope for that field.

Quotations are about as follows:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump				$1.15@1.20
5-in. lump			$1.40	
6-in. lump	$1.75 @ 2.00		1.60	1.40@1.50
Lump and egg	1.50 @ 1.60	$2.25		
No. 1 nut	1.40 @ 1.60			
Screenings	0.50 @ 0.60			0.25
Mine-run	1.50			0.90
No. 1 washed nut	1.60 @ 1.70		1.40	
No. 2 washed nut	1.25 @ 1.35		1.60	
No. 3 washed nut	1.10 @ 1.15			
No. 4 washed nut	1.10 @ 1.15			
No. 5 washed nut	0.40 @ 0.50			

KANSAS CITY, MO.

Restricted supply of gas stimulating the demand for coal. Fall in temperature will create an active situation in the coal market.

Demand for all lines is opening up briskly, despite the fact that little or no cold weather has yet appeared. The early call for coal is due largely to the fact that natural gas will no longer be available, according to a recent announcement to the effect that there will be less than one-third of the normal supply during the coming winter. This statement coming from an authoritative source naturally had the result of stimulating the demand in this section. Cold weather is all that is necessary to insure an exceptional activity among the operating companies. Last winter was an open one, and coal business was comparatively light.

Prices are inclined to stiffen as a result of the natural gas situation. Kansas coal is held at from $1.50@2.50 a ton, f.o.b. the mines. Deep shaft, fancy lump is bringing the higher price, while deep shaft steam slack is quoted at the lower. Arkansas coal is held at the following prices: Grate anthracite, $4.35; egg, $4.60; No. 4, $5.50; pea, $3.25. Indications are for a higher range early in November, when the first cold wave of the year is expected.

PRODUCTION AND TRANSPORTATION STATISTICS

LAKE SHIPMENTS

Anthracite Shipments through the Sault canals for the current year to Sept. 1 were 1,809,401 tons as compared with 26,926 tons for the same period last year.

Butuminous Shipments for the same periods were 10,553,401 for the current year as compared with 8,063,094 in 1912, making gross of 12,362,602 for 1913 and 8,990,020 in 1912.

VIRGINIAN RAILWAY

Total shipments of coal over this road for August of the current year were 376,083 tons as compared with 337,366 tons for the same month last year. For the seven months to Aug. 31 of the current year, the shipments were 2,898,742 tons as compared with 2,245,370 tons for the same period last year, showing a substantial increase.

NORFOLK & WESTERN RY.

The following is a statement of the tonnages shipped over this road during August 1913, and for the eight months ending Aug. 31, as compared with corresponding periods of 1912 in short tons:

Destination	August 1912	August 1913	Eight Months 1912	Eight Months 1913
Coal				
Tidewater, foreign	74,964	96,491	1,025,857	1,128,573
Tidewater, coastwise	317,398	372,908	2,437,211	2,597,566
Domestic	1,722,580	1,780,680	11,717,487	12,099,284
Coke				
Tidewater, foreign	2,661	.....	52,762	27,199
Domestic	111,801	108,158	901,139	1,032,310
Total	2,229,404	2,358,237	16,134,456	16,884,932

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for August and first eight months of this year and last year in short tons:

	August 1913	August 1912	Eight Months 1913	Eight Months 1912
Anthracite	713,451	927,277	6,851,626	6,452,287
Bituminous	4,562,339	4,032,727	33,396,286	30,207,895
Coke	1,161,484	1,146,390	9,731,462	8,597,730
Total	6,437,274	6,106,394	49,979,374	45,257,912

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for July 1912-13, and for the seven months ending July 1911-12-13, in long tons:

	7 Months			July	
Imports from:	1911	1912	1913	1912	1913
United Kingdom	5,181	2,697	3,464	50	116
Canada	618,807	765,981	678,611	96,284	76,666
Japan	9,221	18,216	63,665	12,105	9,103
Australia and Tasmania	121,995	80,585	77,634	6,109	15,679
Other countries	137	1,924	2,810	150	1
Total	755,301	869,403	826,184	114,698	101,565
Exports:					
Anthracite	1,986,431	1,645,892	2,448,913	514,645	380,974
Bituminous,					
Canada	5,134,007	5,367,821	7,120,245	1,372,490	1,576,481
Panama	305,624	289,825	321,507	32,358	42,725
Mexico	343,142	210,786	350,961	19,737	18,515
Cuba	575,590	646,462	772,366	84,125	88,088
West Indies	313,085	447,769	377,464	54,355	33,236
Other countries	368,521	1,114,514	1,065,469	105,347	217,979
Total	7,039,969	8,077,177	10,008,012	1,668,412	1,976,124
Bunker coal	3,840,183	4,319,514	4,291,801	559,399	597,011

BALTIMORE & OHIO

The following is a comparative statement of the coal and coke movement over this road for August and the first eight months of this year and last year:

	August 1913	August 1912	Eight Months 1913	Eight Months 1912
Coal	3,295,123	2,919,991	22,899,814	20,588,240
Coke	391,999	409,627	3,231,372	3,063,239
Total	3,687,122	3,329,538	26,131,186	23,651,479

FOREIGN MARKETS

GREAT BRITAIN

Sept. 26—Some men have resumed work, but the Cambrian and Naval men are still "on stop" and it is feared that these pits will remain idle for a few days longer. Very Best Admiralty Large and good second-class qualities are steady for prompt loading, but Monmouthshires are in plentiful supply and prices irregular. Sellers are asking higher figures for prompt smalls, pit stoppages having curtailed supplies. With regard to forward loading, sellers are holding for firm values, but business is slow.

Quotations are approximately:

Best Welsh steam	$4.74@4.92	Best Monmouthshires	$4.02@4.08
Best seconds	4.44@4.62	Seconds	3.84@3.96
Seconds	4.26@4.38	Best Cardiff smalls	2.40@2.52
Best dry coals	4.32@4.56	Seconds	2.22@2.34

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

FINANCIAL DEPARTMENT

The Delaware & Hudson Company

President L. F. Loree of this company reports, in part, for the year to Jan. 1, 1913, as follows:

General Results—The coal-mining department shows a decrease of 842,384 tons in the amount of coal mined, an increase in gross revenue of $42,543, and an increase in net revenue of $469,326. The railroad department shows an increase in gross oper. revenues of $1,058,286, but a decrease of $250,333 in net operating revenues.

Coal-Mining Department—There were mined 6,438,555 gross tons of anthracite coal out of a total of 63,610,578 tons, including product of washeries produced in the region. The amount produced by this company is 842,384 gross tons less than for the year 1911, due to the suspension of work at the collieries from April 1 to May 21, inclusive, on account of strike.

The new agreement entered into by the mine workers on the one hand and the anthracite coal operators on the other, governing the relations of employees and employers in the anthracite region, provides that the terms awarded by the Anthracite Coal Strike Commission and supplemented by the agreements subsequent thereto shall be continued for a further period of 4 years ending Mar. 31, 1916, except in certain particulars [stated seriatim in the pamphlet report], the most important of which is that the contract rates and wage scales for all employees was increased 10% and the sliding scale was abolished.

Other items which tend to cause the cost of producing coal to increase from year to year are: Shafts and slopes are sunk deeper, tunnels extended, and the mined-out area increased, thus lengthening the haul of coal in mine cars, requiring increased transportation facilities, increasing the area to be drained and ventilated, and requiring more employees. Taxes are about four times the amount paid in 1901, notwithstanding the decrease in the unmined coal remaining in the ground. The operating costs of producing coal of this and subsidiary companies, including taxes but excluding sinking fund for depletion of the coal lands, were higher in 1911 than in 1901 by $0.5575 per ton. Some increase in the market price of coal was necessary, even though no increase in wages had occurred, it being impossible to earn a fair return on the investment.

Assuming that in 1912 the mines had been operated under normal conditions, but with the increase of $0.0808 per ton in the cost of mining under the new wage scale, with an increase of $0.0338 per ton in taxes, and with the increase of $0.25 per ton in the market price of pea coal and larger sizes, and with no change in the market price of the smaller sizes (thus making an increase in the average market price per ton of all sizes of $0.1913), there would have resulted an increase over 1901 of $0.6559 per ton in the cost of production and an increase of $0.6231 per ton in the market price, indicating a decreased return to the producer of 3.28c. per ton.

The charges to extraordinary expenses of the coal-mining department amounted to $857,975 (as against $823,654 in 1911, of which $280,323 upon new colliery at Archbald, Penn., which, it is expected, will be placed in operation early in 1913.

Floating Debt—This amounted to $3,500,000 on Dec. 31, 1912, having been increased $2,600,000 in order to finance temporarily addition and betterment work, and to cover advances to sub. companies for construction.

Sinking Funds—There was paid into the sinking fund under the "first & ref." mtge. the sum of $277,040, being 1% on the bonds outstanding May 1, 1912; total paid to date, $896,510, expended in addition and betterments.

The sinking fund under the first lien equipment trust has received $650,000 annually from 1908 to 1912, aggregating $3,250,000, plus interest on balances, etc., $111,968; total, $3,361,968; disbursements, 62 locomotives and 25 cars, etc., acquired, $1,608,494; $306,000 first lien equipment bonds purchased and retired (incl. int.), $312,171; balance, securities and cash in hands of trustees, $1,441,303.

There was also accumulated in the coal department sinking fund $285,486, $11,780 of which was applied toward cost of coal lands purchased in Wyoming section, and the balance to advances to the Schuylkill Coal & Iron Co. and the Shanferoke Coal Co. for acquisition of anthracite coal lands in Schuylkill County, Penn.

BALANCE SHEET DEC. 31

Assets—	1912	1911	*Liabilities*—	1912	1911
Unmined coal owned and controlled	16,397,241	16,667,697	Capital stock	42,503,000	42,503,000
Advances on unmined coal	354,033	361,130	Bonds (see "Ry & Ind." Sec.)	58,171,000	58,375,000
Real estate	*805,850	4,846,119	Loans payable	3,500,000	900,000
Road & Equipm't—D. & H. Co.	*65,814,079	58,858,151	Int., divs., &c., accrued	1,405,209	1,371,744
Canadian lines	6,331,868	6,308,140	Int., divs. and bonds due, not yet collected	195,087	210,796
Marine equipment	6,726	31	Accrued taxes	157,042	109,645
Coal dept. equip	1,303,362	1,263,292	Spec. reserve fund accts.	9,738	9,393
Coal-handling and storage plants	61,134	95,877	Audited vouchers and payrolls	3,052,054	2,773,501
Stocks & bonds *a*	27,088,094	27,014,189	Other accts. payable	552,480	707,107
Cash	1,182,560	1,921,784	Additions to property prior to June 30 1907 through income	6,751,837	6,751,837
Fire insurance fund	373,904	336,724	Profit and loss	15,199,924	13,486,598
Spec. res. funds	9,738	9,393			
Equip. trust fund	1,441,303	1,196,135			
Special deposits	.....	596,678			
Supplies on hand	2,781,675	2,885,682			
Bills & accts. rec.	4,118,197	2,790,469			
Adv., new lines	3,427,608	2,047,129			
Total	131,497,371	127,198,621	Total	131,497,371	127,198,621

* Decrease in real estate caused by transfer of RR. real estate to "road and equipment."

a The total par value of stocks owned in 1912 was $26,178,283, against $26,128,283 in 1911 (value as per balance sheet in 1912, $22,363,297); par value of bonds, $4,950,716 in 1912, against $4,923,716 (value as per balance sheet in 1912, $4,724,796). The main change in securities is the Hudson Coal Co. stock, $2,500,000 (increased from $100,000) and bonds, the new items of Champlain Transportation 1st income debentures ($250,000), Ft. Wm. Henry Hotel Co., income debentures ($272,000), Bluff Point Land Improvement Co. income debentures ($250,000) and Chateaugay Ore & Iron Co. 1st M. ($281,000).

b Unexpended balance from proceeds of bonds deposited with trustee to defray cost of authorized additions and betterments.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Oct. 4:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	....	....	80	87	80
American Coal Products Pref	....	....	105	109½	105
Colorado Fuel & Iron	31¼	28½	28¾	41½	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	102½	102½	102½	102½	102½
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com	51½	51	51	53½	47½
Island Creek Coal Pref	84½	84	84	85	80
Pittsburgh Coal	22¼	19⅜	21½	24⅜	14½
Pittsburgh Coal Pref	92	86½	90	95	73
Pond Creek	22¼	21	21	23¾	16½
Reading	169⅞	165	166¼	171	151⅜
Reading 1st Pref	....	....	87	92½	84
Reading 2nd Pref	91½	91	91	95	84
Virginia Iron, Coal & Coke	45	44	44	54	37½

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	95	99½	98	Sept. '13	93½	99⅛
Colo. F. & I. gen. 6s	103	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	81	81½	80¾	81½	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92½	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	91	..	85	85½	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77	79½	78½	Sept. '13	73	80½
Tenn. Coal gen. 5s	99	..	99	99	98½	103
Birm. Div. 1st consol. 6s	100⅜	102½	101⅜	101⅜	100⅜	103
Tenn. Div. 1st g 6s	100⅜	102	102	102	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	....	....	..	..
Victor Fuel 1st s f 5s	..	75	80	May '13	79¾	80
Va. I. Coal & Coke 1st g 5s	92½	..	93	Sept. '13	92	98

DIVIDENDS

Pittsburgh Coal Co.—Regular quarterly dividend on the preferred stock of 1¼% payable Oct. 25 to holders of record, Oct. 15.